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RCRA Technical Case Development Guidance Document

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Final

U.S. Environmental Protection Agency
Office of Waste Programs Enforcement
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Washington, DC 20460

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PART 1. INTRODUCTION

The purpose of this document is to provide, for the first time, a single consolidated reference of information useful to RCRA inspectors, enforcement officers, and attorneys in the development of enforcement cases. This document covers various aspects of technical case developing, including: the role of inspectors, pre-inspection activities, investigative procedures (sampling, and review of records), administrative procedures, and preparing technical information to support litigation. While some materials were developed specifically for this guidance, the vast majority was drawn from existing manuals and guidance. In some instances materials developed for other regulatory programs were found to be valuable, and drawn upon. Where appropriate these materials have been rewritten or edited to ensure they reflect an appropriate RCRA enforcement focus. A number of technical resources available to assist RCRA case development, and a bibliography of references are also provided at the end of this document.

1.1 THE IMPORTANCE OF INSPECTIONS IN THE CASE DEVELOPMENT PROCESS

The purpose of inspections is to ascertain a facility's compliance status, the extent of any noncompliance, and the potential for, or extent of any releases. They play an important role in case development. As the enforcement process develops, the inspector and/or the enforcement officer may be called upon to provide technical input and analyses, assist attorneys in negotiations, and present evidence during administrative or judicial proceedings. In some Regions and States, the inspector is the enforcement officer. Inspections are an integral part of the enforcement process. They may be carried out to address a specific enforcement concern, or be part of the routine and compliance/oversight activities undertaken by the Agency. In either case the inspectors must be aware that the information that they gather may be used in an enforcement proceeding, and should conduct themselves accordingly.

There are several types of inspections under the RCRA program:

- Compliance evaluation inspections
- Comprehensive ground water monitoring evaluations

- Case development inspections
- Report/plan reviews
- Operation and maintenance inspections
- Laboratory audit inspections
- RCRA corrective action inspections.

The compliance evaluation inspections (CEIs) are usually performed to evaluate a facility's compliance with the provisions of RCRA and to determine the need for enforcement actions or follow-up inspections or actions. Most inspection information is documented in the inspector's report. The report may contain a field sketch of the site depicting regulated treatment storage and disposal areas, solid waste management units (SWMUs), and the site topography. An examination of site records and plans is performed as part of the CEI.

Numerous types of incidents are encountered by inspectors during CEIs that could lead to enforcement actions. For example, if during the course of a CEI an inspector found evidence that the owner/operator was disposing of noncontainerized liquid hazardous wastes in a hazardous waste landfill, in violation of HSWA provisions, such evidence could form the basis for an enforcement action. The inspector's initial findings could prompt the performance of a case development inspection/evaluation or report/plan review to gather more extensive evidence. The revised RCRA Inspection Manual (March, 1988) provides guidance on conducting this and other types of inspections.

Comprehensive ground-water monitoring evaluations (CMEs) are conducted to determine the adequacy of a facility's ground-water monitoring system design and operation. They involve an evaluation of the hydrogeology beneath the facility. During a facility's detection and assessment monitoring phases, all facility reports and plans that are pertinent to ground-water monitoring are evaluated. For facilities in the assessment phase, the assessment plan is also reviewed in detail.

Under detection monitoring, the location and construction of monitoring wells, and site characterization data are evaluated to determine whether they are adequate to immediately detect any contamination from the facility. Under assessment monitoring, field verification of the adequacy of the assessment monitoring plan design and implementation is undertaken to determine whether the release can be properly characterized.

All CMEs involve an evaluation of the owner/operator's ground-water sampling, collection and analyses procedures. This includes the construction of a site map indicating well locations, waste management areas and the site topography. Where the owner/operator's sample preparation procedures are inconsistent with EPA approved procedures, the inspector should collect the required samples and splits the sample with the owner/operator.

Because of the level of detail to which the CMEs are conducted, there is usually no need for a follow-up inspection for data gathering purposes, and enforcement action may follow directly. For example, if the evaluation shows that the present location of wells is inadequate to ensure that releases would be detected, the information gathered could form the basis of an administrative order requiring the installation of additional wells.

Case development inspections (CDI) may involve sampling to confirm the chemical composition/characteristics of wastes handled by generators and transporters, and their waste handling practices. In addition, facility operation and design information may be reviewed, and manifests from generators and transporters verified. As stated previously, a focused CDI may be conducted when a CEI reveals possible RCRA violations, and could serve to gather the additional data needed to support an enforcement case.

Report/plan reviews (R/PR) are detailed reviews of site plans, reports and documents for compliance with RCRA regulations. This includes a review of closure and post-closure plans, financial assurance documents, ground-water monitoring waivers, waste analysis plans, sampling and analysis plans, assessment monitoring plans, annual reports, manifests, contingency plans, and preparedness plans. Also, inspection reports or reports on corrective action (RFAs, RFIs, etc.) are reviewed. Based on the findings of these reviews, a CEI or CDI may be scheduled to determine whether any detected violations or deficiencies were on-going.

Operation and maintenance inspections may be conducted as a part of, or independent of a comprehensive groundwater monitoring evaluation. Under an O & M inspection the actual field procedures used for groundwater sampling are evaluated. The focus of O & M inspection is on sampling activities as opposed to the design and location of sampling wells. The Operation and Maintenance Inspection Guidance (March, 1988) provides guidance on conducting this type of inspection.

RCRA laboratory audit inspections (RLAI) are conducted to either assess the adequacy of an owner/operator's laboratory performance, or to assist in resolving discrepancies that might exist between EPA analytical results, and those produced by the owner/operator's laboratory. Inadequate laboratory performance or invalid data from the facility could strengthen an enforcement case for the Agency or the States. The RLAI includes a review of the following:

- The owner/operator's sampling and analysis plan
- Laboratory staffing
- Laboratory equipment, and equipment maintenance programs
- Quality assurance/quality control procedures
- Sample tracking systems
- Analytical procedures.

The RLAI is not a RCRA certification program for analytical laboratories; it is an exercise to determine the credibility of analytical data. EPA is currently developing guidance on RLAI procedures.

RCRA Corrective Action Inspections

The RCRA corrective action program consists of three phases (EPA, 1986 RCRA Facility Assessment Guidance):

- The RCRA Facility Assessment (RFA) to identify releases or potential releases requiring further investigation.

- The RCRA Facility Investigation (RFI) to fully characterize the extent of releases.

- Corrective Measures (CM) to determine the need for an extent of remedial measures. This step includes the selection and implementation of appropriate remedies for all problems identified.

The RCRA Facility Assessment is a three-stage process for:

- Identifying and gathering information on releases at RCRA facilities
- Evaluating solid waste management units (SWMUs) for releases to all media and regulated units for releases to media other than ground water
- Making preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility.

During the RFA, EPA or State investigators will gather information on SWMUs and other areas of concern at RCRA facilities. They will evaluate this information to determine whether there are releases that warrant further investigation or other action at these facilities. Upon completion of the RFA, Agency personnel should have sufficient information to determine the need to proceed to the second phase (RFI) of the process.

All three steps of the RFA require the collection and analysis of data to support initial release determinations:

- The preliminary review (PR) focuses primarily on evaluating existing information, such as inspection reports, permit applications, historical monitoring data, and interviews with State personnel who are familiar with the facility
- The visual site inspection (VSI) entails the collection of visual information to obtain additional evidence of release
- The sampling visit (SV) fills data gaps that remain upon completion of the PR and VSI.

1.2 ORGANIZATION OF THIS GUIDANCE DOCUMENT

This guidance manual is comprised of six additional Parts beyond this Introduction. These are:

Part 2 PRE-INSPECTION - which includes: inspection authorities, the obligations of the owner/operator, identifying the purpose of the inspection, and pre-inspection planning activities.

Part 3 INVESTIGATIVE PROCEDURES - the most lengthy part of the manual, covers: entry, walk-through inspections, documentation, and sampling to support enforcement (with both general and media specific sampling information presented).

Part 4 PUBLIC ACCESS TO AGENCY DOCUMENTS - provides the inspector with information on the Freedom of Information Act, the proper handling of confidential business information, and the discovery of information during enforcement actions.

Part 5 PREPARATION OF COMPLIANCE INFORMATION FOR AN ENFORCEMENT ACTION - presents information on the preparation of technical information for litigation, and the role of the inspector as a witness.

Part 6 CASE STUDIES - Examples of enforcement cases from EPA Regions and States.

Part 7 TECHNICAL RESOURCES TO ASSIST IN CASE DEVELOPMENT - provides information on a variety of possible resources that the inspector or enforcement officer may draw upon for assistance during case development. The information provided includes EPA in-house capabilities, the use of EPA contractors, and assistance available from other government agencies. Wherever possible, synopses are provided of the type of assistance that could be expected, and the procedure which the inspector, enforcement officer, and attorneys must follow to request assistance.

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PART 2. PRE-INSPECTION

2.1 INSPECTION AUTHORITY

Under Section 3007(a) of the Resource Conservation and Recovery Act inspectors are authorized to inspect any establishment that generates, stores, treats, transports or disposes of, or otherwise handles hazardous wastes, for the purpose of developing or assisting in the development of any regulations or assisting in the enforcement of the Act. Inspectors granted this authority are officers, employees or representatives of the Environmental Protection Agency, duly designated by the Administrator, or any duly designated officer, employee, or representative of a state having an authorized hazardous waste program. These inspectors are authorized to:

- Review and copy documents;
- Enter at a reasonable time any establishment or other place where hazardous wastes are, or have been, generated, stored, treated, disposed of, or transported from; and
- Inspect and obtain samples from any person of any such waste and samples of any containers or labeling for such waste.

Inspections must be conducted in a prescribed manner, which includes the following:

- Presenting the appropriate identification to the owner, operator, or agent in charge of the premises to be inspected;
- Entering the establishment at a reasonable time and completing the inspection with reasonable promptness;
- Issuing a receipt for samples;
- Providing a duplicate sample (split sample), if requested; and
- Furnishing the owner, operator or agent in charge a copy of any sample analysis, if conducted.

More details of inspection procedures can be found in the RCRA Inspection Manual (March, 1988).

2.1.1 Warrants

If access to a facility is refused, or if during the course of an inspection the owner/operator withdraws his consent to the inspection, a warrant may be required to gain entry. Warrant acquisition procedures are described in Section 3.1.1.1. A warrant may be obtained where there is specific reason to think that a violation has been committed, or that a release may be occurring. In addition, warrants may be obtained before entry to a facility if the inspector believes that denial is highly possible or if immediate access is needed to abate an endangerment.

2.2 OBLIGATIONS OF THE OWNER/OPERATOR

In addition to providing the inspection authorities delineated above, Section 3007 of the Act also sets forth obligations on the part of the owner/operator. The owner/operators are required to furnish information relating to their hazardous waste activities, and to permit authorized inspectors, at reasonable times, to have access to and copy all records relating to such wastes.

2.3 IDENTIFYING THE PURPOSE OF THE INSPECTION

Broadly stated, the purpose of an inspection is to ascertain the compliance status of the regulated facility, the extent of any noncompliance, the potential for, or extent of releases; and to assist as needed in preparing orders or legal actions to correct the violations and deficiencies. For any particular inspection, the inspector may have more focused objectives. These objectives should be clearly defined for each inspection and form a basis for pre-inspection activities. Specifically, the inspector should define the desired product that will result from the inspection, both in terms of content and format. Where an enforcement case already exists, the delineation of inspection goals and products would be made in conjunction with the enforcement officer and the lead Agency attorney assigned to the case.

2.4 PRE-INSPECTION PLANNING ACTIVITIES

In this section of the manual a number of pre-inspection planning steps are discussed. While it is realized that inspectors will not always have the time to go through each of these steps, it is suggested that inspectors at least understand the purpose of each recommended step to ensure that any omissions are the result of a conscious decision rather than an oversight.

Based on desired inspection goals and products that have been identified, planning of the inspection should include a number of steps. (These steps are not presented as a rigid chronology since logistical concerns will have a major influence, and some activities can occur simultaneously.)

A. Establishing the Scope of the Inspection - is a necessary step for ensuring the efficient use of inspection time, and providing a clear focus for the inspection. For example, this could include developing a list of:

- Applicable regulations for which compliance will be ascertained
- The locations of specific operation units, waste treatment units, and solid waste management units that need to be inspected
- Specific steps that need to be taken to verify, or determine the proper classification of wastes, possibly through inspection of processes generating the wastes.

The specific details of these activities would include:

- Files that need to be reviewed
- Persons who should be interviewed
- Sampling locations.

Reference lists of this kind are especially helpful at large facilities where it would be impractical to tour the entire site, and where only an extremely efficient use of time would allow inspection goals to be met.

B. Identifying the Types of Skills Necessary for the Inspection - is a logical next step. Depending on the scope of the inspection, it may be desirable to have inspectors with specialized skills (for example, hydrogeologists to determine well-siting issues, or chemical engineers to determine whether a chemical is being used as a solvent in a manufacturing process). It is important to identify these needs at an early stage as evidence gathered may need to be presented in subsequent legal proceedings by qualified professionals. Omitting this step could necessitate a second inspection.

C. Conducting a Review of Available Agency and State Records - is a necessary and perhaps an obvious step. However, the thoroughness of the review undoubtedly varies depending on the ease with which information can be made available, and other assignments that require the inspector's attention. The documents that need to be reviewed will vary depending on focus of the inspection and whether an actual enforcement case is ongoing. The information gathered during this review of information serves two functions: (1) it provides the inspector familiarity with both historical and current practices and conditions at the site; and (2) it can help to establish the ultimate admissibility of information gathered during the inspection. Tables 2-1 and 2-3 provide a listing of documents that may be available to the inspector, and the utility of each. Through the authority granted in Section 3007, the inspector can also obtain desired information from the regulated public. State hazardous waste personnel should be contacted to obtain up-to-date information on a particular site. Facilities are required to maintain a number of plans on-site (which may also be part of the permit application). If available in Agency files, these documents (Table 2-2) should also be reviewed for pertinent information.

In addition to RCRA enforcement files, a wealth of information and knowledge may be gained from consultation with other Offices within the Agency. These include RCRA Permits Branch, and possibly the Water and Air Offices, if the facility possesses permits issued under these programs.

D. Arranging Sampling, and Laboratory Support - should sampling be necessary as part of the inspection, it will be necessary to identify as specifically as possible locations, the method of sampling that must be utilized, the pollutant parameters that will be analyzed for, the expected sampling conditions, and the appropriate QA/QC standards. All of this information should normally be contained in a sampling plan. This will allow the inspector to identify the number of persons who need to be involved in sampling, the types, and amount of sampling equipment that will be necessary, the sample containers and preservatives that will be required, and any logistical or safety concerns relevant to the site (and the need for specialized equipment). The development of sampling plans should not be regarded as a desk top exercise. Good sampling plans generally draw upon an inspector's first hand knowledge of a site, and may be fine tuned when actually in the field. More information on sampling plans is provided in 3.3.1.1. Since it is not unusual for analytical laboratories to have long turn-around times, the inspector needs to consider whether any special arrangements need to be made to ensure that the results of sample analyses will be available for timely use in enforcement proceedings. In this regard, scheduling the processing of samples with laboratory personnel is essential. Assistance in the preparation of certified sample bottles, and sample analysis may also be available through the Contract Laboratory Program. Details of this program and methods for requesting assistance are provided under Part 7 of this manual.

TABLE 2-1. EPA/STATE DOCUMENTS AS REFERENCE SOURCES FOR THE INSPECTOR

1. RCRA PROGRAM	• Notification Form and Part A Application - Although not very detailed, the notification form and Part A application may be used to gain a general understanding of facility operations. • Manifests and Biennial Reports - Manifests and biennial reports must be kept on file to verify the transfer of wastes on and off site. They may be used to gain a historical perspective of wastes handled at the facility. • Correspondence - Correspondence between the owner/operators and the regulating agency may be reviewed in order to identify trouble areas in the past history of the facility. • RCRA Part B Permit Application and Administrative Record - A facility's Part B permit application and the accompanying administrative record will provide inspectors with detailed background information on: the physical layout and boundaries of the facility; the number and type of solid waste management units that are present; the types and quantities of wastes that are managed on site and the manner in which each is handled; inspection procedures and frequencies, ground-water monitoring procedures and practices; the facility's waste analysis plan. The application also contains design and construction information for all units on site. It is possible that during the public notice period, information provided in the facility's Part B application was modified or supplemented. Changes of this type will be evident in the administrative record. • RCRA Permit(s) - It is quite possible that a facility will have two permits containing requirements and conditions for continued operations. This will occur where a State has been delegated administration of the RCRA program, but has yet to amend its authorities to reflect the changes and additions that resulted from HSWA. Under such conditions EPA may issue a permit containing the HSWA requirements and the State may issue a permit that covers the provisions for which the state is authorized. The permits are legal documents that should contain facility-specific enforceable requirements which may be covered during the course of the inspection.

TABLE 2-1. EPA/STATE DOCUMENTS AS REFERENCE SOURCES FOR THE INSPECTOR (Continued)

1. RCRA PROGRAM (Continued)	• <u>RCRA Statute and Regulations</u> - While many of a permitted facility's requirements are contained in the permit, it is quite conceivable that new requirements resulting from HSWA will not be contained in the facility's permit. This should not be interpreted to mean that the new requirements do not apply to the facility as many provisions are self-implementing. An example of this is the land ban requirements. Inspectors should consult with the enforcement officer or the attorneys to clearly define facility requirements under new regulations or the statute, and to decide whether compliance with the provisions of new regulations should be checked during the course of the inspection.
	• <u>Previous Inspection Reports and enforcement actions</u> - The most recent inspection and sampling reports completed by either State or EPA inspectors will provide the most current information on developments at the facility, an appraisal of compliance, and the extent of any releases. Also, previous enforcement actions will provide information on problem areas.
	• <u>RCRA Facility Assessment (RFA) Reports</u> - If the facility being inspected is subject to corrective action requirements, it is possible that a RCRA facility inspection report will be available. This report may provide details of the geology of the site, the number and types of solid waste management units at the facility, the wastes that are being managed, any evidence of past releases of hazardous substances from these units, and an assessment of the likelihood of releases occurring, or having occurred. In those cases where a release has occurred or where the potential for a release exists the RFA report will also provide information regarding release pathways, and recommendations for actions that should be taken to further quantify the extent of the release and potential impacts.
	• <u>Orders and Consent Decrees</u> - Review of Agency and State enforcement files, and consultation with Agency and DOJ attorneys will reveal any past or currently effective compliance orders or consent decrees that the facility is operating under. These documents will provide details of specific actions that the facility must undertake, frequently in the form of a compliance schedule.

TABLE 2-1. EPA/STATE DOCUMENTS AS REFERENCE SOURCES FOR THE INSPECTOR (Continued)

2. WATER PROGRAM	• <u>Pretreatment Files</u> - A review of pretreatment files will identify those units regulated under the water program instead of the RCRA program. This is a very important distinction. The pretreatment enforcement file will identify violations that may have implications for the RCRA program. • <u>NPDES Files</u> - If the facility has a point source discharge to surface waters, the owner/operator must be granted a permit under the National Pollutant Discharge Elimination System (NPDES). This program is administered by EPA unless authority has been delegated to the State level. In reviewing NPDES files the inspector would be most interested in: - The facility's Form 2C permit application. In completing this document the permittee is required to give a full description of the processes that are generating the wastewater, and any ancillary operations that might contribute to the discharge. This description includes a characterization of the pollutants present in the discharge, their expected concentration, and the loading to the receiving stream. Where applicable, information is provided regarding facility production rates on a seasonal basis. - <u>NPDES Inspection Reports</u> - May provide sampling information for the wastewater, information about process changes at the facility, and the adequacy of any wastewater treatment that is conducted. Inspection reports will also note any unusual conditions that exist, such as unpermitted discharges. - <u>Enforcement Files</u> - May contain records of administrative orders that address noncompliance.
3. AIR PROGRAM	• <u>Air Pollution Control Permit</u> - Facilities that discharge significant amounts of pollutants to the air may be subject to a State air pollution control permit. These permits must be issued before the facility commences construction of the source, such as an incinerator. Information contained in the permit which may be of interest to the inspector

TABLE 2-1. EPA/STATE DOCUMENTS AS REFERENCE SOURCES FOR THE INSPECTOR (Continued)

3.	AIR PROGRAM (Continued)	include: a description of the facility; the maximum treatment or operation unit capacity; a description of pollution control equipment; and the allowable rate of emissions. Air inspection reports should also be checked for incidences of noncompliance or substandard operation.
4.	CERCLA PROGRAM	• Documentation of one particular type of RCRA inspection may be located in CERCLA files rather than RCRA files; this being the report on comprehensive groundwater monitoring evaluation (CME). In accordance with the Superfund Amendments and Reauthorization Act of 1986, annual CMEs will be conducted at land disposal facilities receiving CERCLA wastes to assure that there is no release of hazardous wastes or hazardous constituents into groundwater, surface water or soil. As in the case of other inspection reports, review of this document by an inspector prior to going on-site may assist in providing a more complete and up-to-date understanding of existing conditions.
5.	OTHER ENVIRONMENTAL PROGRAMS	• If applicable for a particular facility, deep well injection (UIC), TSCA, and radiation program files should be reviewed.

TABLE 2-2. CONTENT OF RCRA FACILITY PLANS AND REPORTS*

Content	Waste Analysis Plan	Inspection Plans and Schedules	Personnel Training Schedules and Documents	Operating Record	Closure Plan	Post-Closure Plan
Waste analysis parameters	•				•	
Waste test methods	•				•	
Waste sampling methods	•				•	
Waste analysis frequency	•			•	•	
Generator supplied waste analysis	•			•		
Waste feed limits for incinerators	•	•		•		
Monitoring equipment inspection schedules		•				•
Safety/emergency equipment inspection schedules		•				
Security devices inspection schedule		•				
Information in inspection log		•		•		
Job titles of personnel in hazardous waste management			•			
Job descriptions in hazardous waste management			•			
Training/job experience documents			•			
Training records on current personnel			•			
Hazardous waste quantities and method of treatment/disposal				•		
Location/quantities of hazardous waste on site				•		
Contingency incident reports				•		
Ground-water monitoring data				•	•	
Unit inspection data				•	•	•
Permit notice to generators				•		

TABLE 2-2. CONTENT OF RCRA FACILITY PLANS AND REPORTS (Continued)

	Waste Analysis Plan	Inspection Plans and Schedules	Personnel Training Schedules and Documents	Operating Record	Closure Plan	Post-Closure Plan
Content (Cont.)						
Closure/post-closure cost estimates				•		
Certification of waste minimization				•		
Description of unit closures					•	
Description of facility closure					•	
Estimate of maximum hazardous waste inventory					•	
Removal/decontamination procedures					•	
Schedule of closure for units					•	
Expected date of final closure					•	
Maintenance activities for units						•
Contact during post-closure						•
Closure/post-closure cost estimates					•	•
Corrective action	•	•		•	•	•

*The following plans and reports are required of all the generators of hazardous waste:

1. Personnel training record
2. Contingency plan
3. Inspection records for containers and tanks
4. Manifests and exception reports.

TABLE 2-3. DOCUMENTS WHICH SHOULD HAVE BEEN SUBMITTED TO THE AGENCY SINCE PERMIT ISSUANCE

- Notification that hazardous wastes have arrived from foreign sources (40 CFR 265.12)
- Clean-up notifications following fires, explosions or releases (40 CFR 265.56)
- Manifest discrepancy reports (40 CFR 265.72)
- Closure reports (40 CFR 265.74 and 115)
- Biennial reports (40 CFR 265.75)
- Unmanifested waste reports (40 CFR 265.76)
- Groundwater affects reports and assessment plan (40 CFR 265.93)
- Groundwater self-monitoring reports, including a statistical analysis (40 CFR 265.94)
- Security and corrective action plans
- Other reports, plans or notices required by the permit.

E. Federal/State Interface - In many instances the facilities that are to be inspected are located in States that have approved RCRA programs. However, there should be no mistaking that while the daily administration of the program may have been delegated to the State level, EPA maintains its oversight and enforcement authorities. EPA must notify an authorized State of an upcoming inspection, and the State can decide whether or not to have a State inspector accompany the Federal inspector. However, it is recommended that EPA notify the states of upcoming inspections whether or not the states are authorized. Representatives of other State programs may also want to take part in the inspection, if authorized to do so. Where joint inspections are to occur, the inspector (or lead Agency attorney, where one has been appointed), should meet with their State counterparts to determine the roles that each shall play. It is important that a lead Agency, and lead inspector be identified as a part of the planning process, and that the parties have shared, or at least compatible objectives in conducting the inspection. Where objectives differ markedly, Agency and State inspectors may wish to consider the possibility of a separate inspection. A major advantage that can result from joint inspections is the more efficient sharing of information and resources.

F. Compliance with Health and Safety Requirements - Provisions of the Superfund Amendments and Reauthorization Act of 1986 required the Occupational Safety and Health Administration (OSHA) to amend their regulations regarding training requirements for hazardous waste workers. Accordingly, Title 29 Part 1910 has been amended to incorporate the required provisions. Any enforcement personnel who will be going onto the facility site must ensure that they are in compliance with these regulations.

In preparing for any inspection, a final check should be made that the inspector has all of the necessary equipment and documents, before proceeding into the field. This could include any necessary sampling or safety equipment, log books, base maps, chain-of-custody forms, names of facility contacts, a listing of the key items to be covered in the inspection, and finally, the name and phone number of the lead Agency attorney who can be contacted if site access problems arise.

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PART 3. INVESTIGATIVE PROCEDURES

In this part of the manual information is provided to assist the RCRA inspector in data gathering and review activities. To the extent possible, specific information has been provided that has direct field applications. The information provided can be broadly grouped into three categories: entry, field inspection and documentation, and sampling to support enforcement.

3.1 ENTRY

3.1.1 Getting On Site (Unannounced and Announced Sampling Visits)

In planning the sampling visit, the inspector must determine if an unannounced visit is needed to sample wastes or media due to the transient nature of releases or site conditions. However, an announced visit may reduce the adversarial nature of the relationship with the owner/operator and are less likely to result in denial of entry to the inspector. Where an unannounced site visit is necessary to support case development, the inspector should be prepared to contact the EPA Office of Regional Counsel to develop an appropriate response in case entry is denied by the owner/operator. The response to denial of entry should be similar to that for denial during an announced site visit as described below.

The following discussion of entry procedures for announced site visits is taken from Protocol for Ground-Water Evaluations, Hazardous Waste Ground Water Task Force, USEPA, 1986.

3.1.1.1 Procedures For Facility Entry

The time of facility entry should be determined by the inspection/ enforcement team. All inspections should be conducted at reasonable times, usually during normal working hours. Inspections can be extended beyond normal working hours provided that the facility representatives agree to the extended hours or as long as the warrant allows.

The inspection team should be aware that consent to enter or remain in the facility may be withdrawn at any time. However, any segment of the inspection completed before withdrawal of consent remains valid. Withdrawal of consent is equivalent to a refused entry. Therefore, a warrant may be necessary in order to complete the inspection.

Entry of the facility is not required to observe and report activities in plain view from an off-site location. This includes observations made while on facility property in areas open to the public, such as matters observed while the inspector presents identification. However, if the inspector does not have a warrant, access to any portion of the facility may be limited.

Entry Procedures

- Present identification

  Upon arrival at a facility, an inspector should introduce himself/herself as an U.S. EPA inspector and present the proper U.S. EPA identification to the owner, operator, or agent in charge regardless of whether identification is requested. The person to whom the credentials are presented may be allowed to closely scrutinize, but not photocopy, the identification. The inspector should keep possession of the identification or credentials at all times.

- Liability form

  Inspectors shall not sign any liability form or release of liability (waiver) when entering a facility under the authority of Federal law.

- Visitor register

  It is permissible to sign a sign-in sheet, log, or visitors register when the register only requests the name, government agency, date, and time.

- Demeanor

  U.S. EPA inspectors are required to perform their duties in a professional and responsible manner. The use of an official position for personal gain is unlawful. Inspectors are also required to collect and report the facts of an investigation completely, accurately, and objectively. The inspectors must conduct themselves at all times in accordance with the regulations prescribed in the U.S. EPA handbook, "Responsibilities and Conduct For EPA Employees".

Denial of Entry

If an inspector is refused entry to a facility for the purposes of an evaluation under Section 3007 of RCRA, certain procedural steps must be carefully followed (these steps vary slightly from State to State). These steps are as follows:

- Present proper identification to the facility representative (owner/operator), and state clearly the purpose of the inspection.
- Thoroughly document the event, noting time, date, and facility personnel encountered.
- If entry is denied, ask the reason for denial.
- The inspectors should not discuss potential penalties or do anything in a manner that may be construed as threatening.
- If entry is still denied, exit from the premises and document any observations made pertaining to the denial, particularly any suspicion of violations.
- Report all aspects of denial of entry to the U.S. EPA Office of Regional Counsel for appropriate actions. Regional Counsel can obtain an administrative inspection warrant.
- A U.S. EPA Office of Regional Counsel attorney and/or State counsel will assist the inspector in preparing documents necessary to obtain a search warrant and will arrange for a meeting with the inspector and a U.S. Department of Justice (DOJ) attorney if necessary. The document should describe the needs and urgency for the inspection. The documents should identify the potential or suspected endangerments to human health and environment posed by the operations of the facility and the needs for verification of compliance with the relevant rules and regulations. The inspector will bring a copy of the appropriate draft warrant and affidavits to the meeting.
- The U.S. EPA Office of Regional Counsel attorney will inform the appropriate Headquarters Enforcement attorney of any denials of entry and send a copy of all papers filed to U.S. EPA Headquarters.
- The DOJ attorney will then secure the warrant and forward it to the U.S. Marshal who will serve it to the owner/operator.

Search Warrant

An inspection conducted under a search warrant will differ from a normal inspection. The following procedures should be complied with in these situations:

- Use of a warrant to gain entry
  - The inspector should be accompanied by a U.S. Marshal if there is a high probability that entry will be refused even with a warrant or when there are threats of violence
  - The inspector should never attempt to make any forceful entry of the facility
  - If entry is refused to an inspector holding a warrant but not accompanied by a U.S. Marshal, the inspector should leave the facility and inform the U.S. EPA Office of Regional Counsel.
- Use of a warrant to conduct the inspection
  - A warrant supersedes the provisions in RCRA, therefore, the inspection must be conducted strictly in accordance with the warrant. If the warrant restricts the inspection to certain areas of the premises or to certain records, those restrictions must be followed.
  - If sampling is authorized, all standard procedures must be followed carefully, including presentation of receipts for all samples taken. If the warrant so states, the facility must be informed of its right to retain a portion of the samples obtained by the inspector (split samples).
  - If records or property are authorized to be taken, the inspector must provide receipts to the owner/operator and maintain an inventory of all items removed from the premises.
  - In accordance with the warrant, the inspector should take photographs of all areas where violations are suspected. Photographs should also be taken at each sampling location as a normal procedure.

3.2 FIELD INSPECTION AND DOCUMENTATION

3.2.1 Inspection of Facility Records

As noted in Part 2 of this manual, Section 3007(a) not only authorizes an inspector to enter upon the facility's property for purposes of conducting a visual or sampling examination of the premises themselves, but also to review any records maintained by the facility which relate to hazardous wastes generated, stored, treated, transported, disposed or otherwise handled by the facility if needed. In addition to access, the statute guarantees the inspector's right to copy these documents as deemed necessary. This authorization extends to records kept off-site at a second office of the facility (e.g., the downtown office in a metropolitan area). In addition, a Section 3007 letter can be used to request this information with or without a site visit.

The inspector may also wish to examine other reports, plans and notices to determine whether the facility has fulfilled its duty to keep the Agency properly informed. Although records review at the facility is important, the inspectors should not neglect the importance of the field inspection. Therefore, time should be allocated appropriately for each.

3.2.1.1 Reviewing Facility Records

The documents that the inspector will be interested in reviewing will be dependent on the specific goals of the inspection. If specific documents can be identified as part of the pre-inspection process, the inspector may want to request that these be available before venturing in on-site. Otherwise, the opening conference provides an opportunity for the inspector to ask that the documents be made available.

In general the inspector should focus the review of documents to those that are not contained in Agency files, or documents that will have been up-dated since they were last submitted to the Agency. These records might include:

- The facility's Waste Analysis Plan - which, among other things, may contain information indicating the points of sampling, and the results of analysis of wastes for compliance with land ban provisions.
- The facility's Operating Record - made up of a variety of documents including manifest or shipping reports, and results of groundwater monitoring, inventories of wastes treated by unit. (See Table 2-1 in Part 2 - Pre-inspection Activities.)
- Manifests.

- Material safety data sheets.
- Contingency plan.
- Personnel Training Records and Documents - indicating the dates and manner in which facility personnel received instruction on proper operating and safety practices.
- Copies of environmental audits conducted by or for the facility if available.
- Workman's compensation claims - may indicate exposure related claims.
- Production record - provides information about raw materials, intermediate and end wastes handled at the facility.

Finally, if time and resources allow, the inspector should consider filling in any data gaps by interviewing other persons who may have information about the facility after consulting with the Regional or State counsel. These persons include:

- Local or State health, engineering, zoning utility offices
- Area environmental organizations
- Persons living in close proximity to the facility.

3.2.1.2 Collecting and Identifying Records for Use in Enforcement

Collecting Records for Evidence

As noted above, RCRA specifically authorizes an inspector to copy facility records which are related to the generation, transportation, treatment storage or disposal of hazardous waste. Assuming access is obtained, the inspector should be allowed to either make copies of documents himself or request that they be made during the course of the inspection.

If the inspector knows of the existence of certain documents he deems necessary to collect, he can request it via a 3007 letter or he can request that copies be made prior to his arrival. In the alternative, he may request that certain documents be copied and forwarded to him after the inspection has concluded. In the event the facility does not have the means to copy some or all of the documents (e.g., the information is stored on microfilm or microfiche), the inspector may want to copy them using his camera.

Authenticating Records for Evidence

Inspectors should always conduct their inspections as if their observations were critical to successfully completing an enforcement action. Proper procedures to identify and document information must be followed even at facilities which the inspector believes to be in compliance. In the event noncompliance or criminal activity is detected, the enforcement case will only be as strong as the evidence supplied by the inspector.

In order to be introduced as evidence in an enforcement action, the authenticity of a record must be demonstrated by the party offering the document. To make this showing, it is necessary for the inspector to mark every document for later identification and record its existence in a field notebook or logbook, etc. Proper identification of records is frequently accomplished by placing the inspector's initials, along with the date it was obtained and a unique serialized number, somewhere on the face of the document. The numbering scheme is then used to record the document's existence in the inspector's logbook. The inspector's observations or comments on the document (e.g., the document's source and location) should also be recorded in the logbook and not appear on the document itself. The question of the logbook's admissibility will be discussed in Section 3.2.3.3, below. Of course, all notations should be made in indelible ink to be effective.

3.2.2 Field Inspection and Interviews with Workers

Once preliminary discussions with the facility representatives have concluded, the inspector may begin the tour of the facility. Inspectors must be alert to all aspects of the facility and be constantly on the lookout for actual or potential violations. As noted above, inspectors will typically be accompanied by at least one representative of the facility. This employee may prove very helpful by explaining the operation and processes at the facility. However, the inspector should ask probative questions and to challenge statements in order to verify their accuracy. For example, if an employee states that the facility has discontinued using a particular treatment unit, the inspector should request to examine that unit anyway. Answers to these "follow-up" questions will give the inspector a clearer insight into conditions at the facility.

The inspector must determine what facility employees he would like to interview. Whenever possible, plant operators should be questioned on routine practices at the facility. In the event the inspector will be interviewing more than one employee, these discussions should be held on a one-on-one basis whenever possible. When a violation is observed, the inspector should clearly document the facts (e.g., the number of leaking containers, labels, waste identification, description of the nature and scope of a spill). Since the inspector's log book and other inspection documents are discoverable during court proceedings, any overly subjective or opinionated statements could be used by a defendant to show prejudice on the inspector's part. Therefore, the inspector should only record factual information.

3.2.2.1 Postinspection Interview

Facility officials are usually anxious to discuss the findings of an inspection prior to the departure of the inspector(s). A closing meeting or conference should be held for the presentation and discussion of preliminary inspection findings. This closing meeting or conference is an ideal time to obtain answers to final questions, to prepare necessary receipts, to provide information about RCRA, and to request the compilation of data that were not available at the time of the inspection. During the closing meeting, there are a number of things the inspector should be aware of. The inspector should be admonished not to characterize any findings as "violations" when debriefing the company unless he/she is absolutely certain they are. A finding of violation is usually made by an enforcement official after consideration of all facts and evidence regarding a potential violation. It would be, at the very least, an embarrassment for the Agency to have the company spend money correcting a "violation" cited by an inspector, only to find that upon further consideration that a violation did not exist. The only exception should be where an imminent threat to human health is likely. Also, the inspector should be warned not to speculate in front of the company as to what enforcement actions will be taken. If there is more than one inspector conducting the inspection, they should discuss and compare their notes prior to debriefing the company. This discussion prior to debriefing will help to discuss discrepancies in inspection findings, avoid disagreement in front of the company, and establish respective roles in debriefing the company.

3.2.3 Documentation of Inspection

After each field inspection, the inspector should "document" his observations and findings regarding the facility's conditions. This documentation preserves these conditions so that they may be presented to a court at a later date and may be accomplished using a number of techniques.

3.2.3.1 The Inspection Report

Once the inspector returns to the office, a report of his findings must be prepared and inserted in the facility's compliance file. This report must be detailed, concise, comprehensive, organized and factual. The inspection report is prepared for two purposes: 1) to illustrate the need for permitting or enforcement actions; and 2) to prepare for future inspections. Because inspector's notes and other records of inspection may be used for enforcement actions, care should be taken to record information or evidence professionally. Avoid personal remarks. Also, in most cases, the report will likely be used by personnel who lack the inspector's on-site experience. Therefore, the report must include the following basic elements:

- A brief description of the facility, including the name and address of the owner/operator
- A description of the portions of the facility which were examined including the hazardous wastes and conditions of the site
- A description of any sampling activities performed during the inspection
- A detailed description of all potential violations or facts observed by the inspector such as the nature and scope of violations, location and potential for harm, extent of deviation, and types of wastes and units involved. Additional evidence collected, such as photos or log book recordings should be included.
- Indications of "suspected" or potential violations as well as areas of the facility which were not inspected, if any
- The name and title of all persons with whom the inspector discussed the facility as well as other persons present during these conversations
- Other potentially relevant facts and characteristics, such as weather.

A basic four-step procedure applies to the preparation of inspection reports, regardless of the specific nature of the elements/contents. Each of these steps is briefly described here:

- Reviewing the information - The first step in preparing the report is to collect all information gathered during the inspection. The inspector should assemble checklists, field notebook, photos, maps, and drawings and review the material for relevancy and completeness. When gaps in information are discovered, the inspector should obtain necessary data by means of a telephone call or, in unusual circumstances, a follow-up visit.

- Organizing material - Information may be organized in any of several different forms, depending on the requirements of the Agency the inspector represents; however, the report should include each of the elements just discussed and should present the information in a logical, comprehensive manner. The narrative should be easily understandable (perhaps a cross-referencing system with the checklist would be appropriate).

- Referencing accompanying material - All documentary support that accompanies an inspection report should be clearly referenced to enable the reader to locate these documents easily. All documentary support should be checked for clarity prior to writing the report.

- Writing the narrative report - When all appropriate information has been assembled, the narrative section of the report can be written. Its purpose is to present a factual record of the procedures used in the inspection and findings that resulted. Using the field notebook as a guide for preparing the narrative report, the inspector should refer to the routine procedures and practices used during the inspection, but should describe in detail facts relating to potential violations and discrepancies. The report should be developed logically from the organizational framework of the inspection.

A suggested reporting format has been reproduced in Table 3-1 to assist inspectors in organizing their reports.

While preparing the report, the inspector must remember that the document will be public information and refrain from unfounded speculation, or pejorative remarks. The report itself should be signed and dated by the inspector upon its completion. Unless preliminary drafts of the report have been distributed to outside entities for comment (e.g., State or Local officials, etc.), all drafts should be removed from the Agency file and discarded after consulting with the lead attorney. In the event information in the report has

TABLE 3-1. RECOMMENDED NARRATIVE OUTLINE

1.	Facility Information:	(Name, Address, Telephone, EPA ID Number)
2.	Responsible Official:	(Name, Title)
3.	Inspection Participants:	(Name, Agency or Company)
4.	Date of Inspection:	
5.	Applicable Regulations:	40 CFR Parts 260-265 (FR February 26 and May 19, 1980).
6.	Purpose of Inspection:	(Requested By, Inspection Of, Sampling Of, etc.).
7.	State Coordination:	(Assisted by, copy of report to, additional information obtained from).
8.	Facility Description:	(RCRA-Related Activities, e.g., Process and Manufacturing information).
9.	Apparent Violations:	(Citation, Nature of Violation, Evidence).

<u>When Inspecting Generators:</u>

10.	General Standards for Generators:	262.10 - 262.12 (Describe compliance with these standards).
11.	The Manifest:	262.20 - 262.23 (Establish existence of manifest records, assess adequacy with regulatory requirements).
12.	Pretransport Requirements:	262.30 - 262.34 (Review packaging, labeling, marking and placarding procedures for compliance with the regulations. Establish compliance with accumulation time restrictions).
13.	Recordkeeping and Reporting:	262.40 - 262.43 (Establish existence of annual reports and additional reports).
14.	Special Conditions:	262.50 - 262.51 (Inspect for reports of international shipments of waste, and proper notification to the Administrator).

<u>When Inspecting Transporters</u>

15.	General:	263.10 - 263.11 (Ensure that the transporter has obtained an EPA I.D. number).

TABLE 3-1. RECOMMENDED NARRATIVE OUTLINE (Continued)

16. Manifest System and Recordkeeping:	263.20 - 263.22 (Establish existence of manifest records and compliance with manifest procedures).
17. Hazardous Waste Discharges:	263.30 - 263.31 (Ensure the transporter is aware of the responsibilities of this section. Check to see if any discharge reports have been reported to the Department of Transportation as required by these regulations).
When Inspecting TSD Facilities	
18. General Facility Standards:	265.10 - 265.17 (Describe compliance with these standards).
19. Preparedness and Prevention:	265.30 - 265.37 (Check for required equipment and arrangements with local authorities).
20. Contingency Plan and Emergency Procedures:	265.50 - 265.69 (Check records and procedures for adequacy with requirements of this section).
21. Manifest System, Recordkeeping and Reporting:	265.70 - 265.77 (Establish existence of manifest records, operating record, annual report and unmanifested waste report. Assess adequacy with regulatory requirements).
22. Groundwater Monitoring:	265.90 - 265.94 (Examine groundwater monitoring plan and review results of sampling analysis).
23. Corrective Action Program:	264.100 (Review status of corrective action program).
24. Closure and Post-Closure:	265.110 - 265.120 (Review closure and post-closure plan for adequacy with regulatory requirements.
25. Facility-Specific Standards:	265.170 - 265.430 (Depending upon the type of facility being inspected establish compliance with the appropriate regulatory standards).
26. Permit Conditions, if Applicable:	270.10 - 270.33 (Review requirements in the permit.)

been claimed to be confidential by the facility, the confidential information must be kept in a separate, secure location (confidential business information is discussed in greater detail in Section 4.2, below).

3.2.3.2 Photography

Photographs or video tape recordings are the most demonstrative evidence the Agency can offer that a violation has occurred, and photographs often determine the success of an enforcement action. For this reason, one or more cameras should be considered standard equipment for every inspection. Photographs are effective and admissible evidence if they are properly authenticated and accurately reflect the conditions at the facility. If possible, 35mm SLR cameras with automatic focus are recommended. In order to provide the necessary documentation, the inspector should record the following information after each picture:

- Date
- Time
- Type of camera(s), lense(s) and film(s) used
- Photographer if different from person recording information
- Brief description of site/picture
- Direction faced by photographer.

Once the photograph has been developed, this information can be transferred from the inspector's log book to the backs of the photos for ease of reference.

Examples of subjects which the inspector should attempt to photograph include the following:

- Aerial reconnaissance of the facility if economically available
- Posted signs indicating ownership of the facility
- Photos representing the overall facility design
- Photos representing individual RCRA units
- Evidence of releases or leachate (e.g., dead vegetation, discolored waters, etc.)

- Evidence of improper or inadequate maintenance or management practices
- Adjacent land use (e.g., school yard, recreational park, etc.).

If a video camera is available and the owner/operator agrees, it should be used whenever the inspector interviews facility officials or observes the company's self-monitoring practices at the site.

The use of wide angle or telephoto lenses, as well as filters should be limited or avoided since photos taken with this equipment may be held inadmissible.

The inspector should assume that the owner/operator will have no objection to the use of photographic equipment, since the inspector can always testify regarding his observations himself. However, in the event a strong objection is raised in the course of the inspection, the inspector may have to forego the camera rather than prematurely terminating the inspection. There are a number of ways to resolve this issue and to retain the rights of the inspector to take photographs during the inspection. One such way is to use a camera which instantly produces prints. This can also eliminate the common problem of facility demands to process the film. Another method is to use a tripod, with the owner/operator approving each shot before it is taken. In rare circumstances, owners/operators may allow the use of a camera but claim that one or more of the photos depicts confidential business information. If this happens, the inspector must develop the film in a laboratory with confidential clearance.

3.2.3.3 The Inspector's Logbook or Fieldbook

Generally, the inspector's logbook will not be used as evidence in an enforcement action since the testimony of the inspector himself is deemed "better evidence". However, it is crucial that the log entries be properly entered and safeguarded after the inspection since it can be used to refresh the inspector's memory at the time of his testimony. Ideally, the inspector will use a different book for each facility and each entry will appear "diary style" (dated and initialed) and all pages will be sequentially numbered. Inspectors should use their logbooks to record the following notes:

- Facility name, location, date, and ID number
- Agency personnel conducting inspection
- Facility personnel encountered by inspectors
- Sketch of facility's overall layout as well as areas of critical importance (e.g., units)
- Sampling equipment used, including ID number if appropriate
- Photographic information described in Section 3.2.3.2, above
- Observations of facility conditions, practices or procedures which will be discussed in the inspection report
- Results of all monitoring activities or measurements
- Conversation with facility personnel
- Factual descriptions of structures and features (e.g., monitoring well locations and construction, units, contaminant, etc.)
- Evidence of releases or leachate
- Procedures used by the inspection team to unsuccessfully seek entry onto the premises or access to records, etc.
- Report observations.

It is possible that logbooks, like final inspection reports, may be obtained by interested members of the public, including the facility. Therefore, inspectors should avoid personal remarks or derogatory opinions about personnel or conditions present at the facility.

3.2.3.4 Drawings, Maps and Sketches

Schematic drawings, topographic maps, charts and other graphics can lend invaluable support to the inspector's enforcement testimony. Maps should be kept simple and clearly indicate location, size, etc. of the objects being mapped. To the extent these maps or charts are not recorded in the inspector's logbook, they must be properly marked for identification and include a key to symbols, an approximate measurement scale and a directional (north) arrow. Objects which inspectors should map include the following:

- Nearby transportation routes and other permanent landmarks (e.g., roads, railroad tracks, power lines, surface waters, etc.)
- Waste or process areas on site
- Monitoring equipment (wells)
- Areas of past or continuing release
- Other locations (e.g., poor management practices).

3.2.3.5 Audio Recordings

Some inspectors may prefer to record their observations with an audio tape recorder rather than in a logbook. While the use of such equipment is not discouraged, the inspector must examine the machine thoroughly prior to beginning the inspection to determine whether it is in good working order. In addition, spare batteries should be kept on hand to ensure performance. One advantage of these devices is the inspector's ability to record interviews and conversations with facility personnel. As with other records, the inspector must properly mark and safeguard these tapes for possible use in an enforcement action. Transcribing the tapes and certifying or verifying their accuracy is a good means of preserving this evidence for future uses.

3.3 SAMPLING TO SUPPORT ENFORCEMENT

Objectives

For any enforcement action to be successful, it must be based on information that can withstand technical and legal challenges and clearly show noncompliance with regulations, permit conditions, or previous enforcement actions. When sampling at a facility is used to obtain this information, the collection and analysis of samples must be performed in a technically sound manner and all activities must be clearly documented to demonstrate the reliability of the results.

For the results of sampling to be considered free from error or bias due to the technical methods used, the appropriate procedures for sample collection and analysis must be selected and carefully followed. The number and location of samples to be collected and analyzed should be sufficient to clearly show that a violation has or has not occurred. Documentation of sampling and analysis activities must be compiled to show that all samples were properly collected, shipped and analyzed. Documentation must also show that field conditions and any alteration of planned activities did not affect the reliability of the results. All sampling and analysis activities should be planned to address the following concerns:

- Sample collection and analysis activities provide accurate results
- Documentation of activities demonstrates actual conditions and actions for sampling analysis
- The sample locations and numbers clearly show the intended results (the results cannot be questioned because of the variability of the medium sampled or other sources of releases or contamination)
- Chain-of-custody for proper handling of samples.

3.3.1 General Information on Sampling

3.3.1.1 Evaluating Information Needs

The information needs to be met by the sampling and analysis activities must be clearly identified for the case development actions to be planned and implemented. Factors to be considered in determining the amount of sampling needed include:

- Existing information on areas of concern
- Variability of media to be sampled
- Extent of area of investigation.

If sampling is to be conducted to support and confirm existing information for case development, a limited number of samples may be required. Where sampling will be used to supplement existing information, the facility files should be carefully reviewed to identify all relevant information and to assess the utility of this data in the enforcement action. Where sampling will be used as the primary basis for information, a more extensive effort will often be needed to assure that adequate data are obtained.

Some violations to be addressed by enforcement actions are transient in nature, such as the variations of wastestream inputs into waste management units or air releases from waste management areas. In these types of cases, more data will often be required to show the time trend and nature of violations of permit conditions or regulations. Composite sampling or continuous monitoring may be required to reveal this nature of the data.

The number of samples collected should be appropriate for the area of investigation and the objectives of the planned enforcement actions. For example, if a widespread area is suspected of soil contaminations, a number of samples distributed across this area would provide more support in identifying the area of concern and its extent. Ground-water contamination may be shown by the results from one well, but sampling of nearby wells at the facility provides more information on the trends and possible sources of contamination, and provides more support to the basic contention that a release has occurred. The distribution of samples should also be selected in consideration of the pathways for each type of concern investigated. If a unit is suspected of groundwater contamination, then samples should be collected from wells that show the presence of contamination and reveal if the unit is the source of the release.

General Guidance on Sampling Plans

The following general discussion of sampling plan development is modified from RCRA Facility Assessment Guidance (USEPA, 1986). The sampling plan development procedures described here are more elaborate and complete than most other RCRA investigations require. Detailed information on the content of sampling plans is provided in the sections on media specific sampling, in later sections of this Part (3).

The sampling plan is the primary document directing the collection of additional information from the site. When the inspector or the enforcement officer determines that sampling is necessary at a facility, it will be important to clearly specify the data that are required and the reasons for obtaining it. They should remain focused on the objectives of collecting this information, because the choice and extent of sampling locations, methods, and parameters will be critical to their ability to define the extent of contamination and draw meaningful conclusions.

The sampling plan should be developed to collect evidence the investigator needs to make a determination of compliance with applicable standards and conditions. This may involve collecting direct evidence (e.g., subsurface soil samples underneath an unlined lagoon) or indirect evidence (e.g., groundwater sampling at a well downgradient from a SWMU) of a release. For RFA sampling, the investigator should collect samples from the waste source and/or from an environmental medium, and based upon knowledge of the pollutant migration pathway, to evaluate release of constituents that may have originated from a SWMU.

The following sections provide guidance on:

- Determining the extent and locations of sampling at the facility
- Choosing sampling methods and parameters
- The format of sampling plans.

Determining the Extent and Locations of Sampling at the Facility

Once the investigator has determined the need to collect additional information at various areas of concern, he/she will need to determine how much sampling will be necessary. Because of the time and personnel required to conduct sampling, the information collected should be as concise and focused as possible.

The extent of sampling required will vary on a case-by-case basis, and will depend upon the investigator's best professional judgment concerning the need for new information and discussions with Agency attorneys. Several factors should play a role in determining the extent of sampling at the facility:

- The premise that the enforcement officer or inspector is trying to support
- The quality and extent of information previously gathered

- The cooperativeness of the owner/operator
- The complexity of the unit and the potential environmental media of concern.

The following guideline should be followed when determining how much sampling is required: The stronger the case that needs to be made to support the case development the more information that should be collected.

In general, the investigator should seek evidence that a violation of permit conditions or applicable regulations has occurred. One positive sample may be sufficient to confirm the presence of the constituent of concern in a well-defined migration pathway, however, it may be necessary to take samples at several different points to ensure that all of the areas of concern have been sampled.

The investigator should attempt to identify the potential areas of concern during the pre-inspection file review. The location and number of samples necessary to identify a release will vary by unit type and by the migration pathway being investigated. For example, one groundwater monitoring well may be insufficient to identify a release from a closed landfill due to the complexities of the ground-water pathway. However, it may only be necessary to take a volatile organic vapor (HNU) reading from above or around a wastewater treatment unit in order to identify an air release. Each of the media-specific sections that follow (Sections 3.2 through 3.5) contain specific details on determining the extent and location of sampling.

Choosing Sampling Methods and Parameters

The investigator must choose appropriate sampling methods and parameters in order to obtain meaningful sampling results. The sampling plan should specify what methods and parameters will be used at each sampling location at the facility. It should also specify the number of samples to be taken at each sampling point (sampling SOPs and QA/QC guidelines are discussed later in this chapter). The media-specific sections of Part 3 that follow describe many of the sampling methods which will be most valuable during an inspection, and the criteria for choosing them.

In general, it will be possible to choose sampling techniques and parameters which provide information on the unit ranging from general indications of release to precise, quantitative evidence or a release. In some cases, it may be appropriate to take screening level measurements (e.g., a VOC measurement with an HNU photoionizer), while in other cases it may be necessary to sample for specific organic or inorganic compounds. As stated previously, sampling for specific compounds will generally provide the most useful results. This will aid in developing more successful enforcement actions.

Sampling for indicator parameters such as total organic halogens (TOX), conductivity, or pH may be useful when the investigator has little or no idea what wastes may have been released for a medium. However, these parameters can give only limited information and will not provide sufficient evidence of release in most cases. The investigator should choose those sampling methods that will provide the most usable results.

For example, when investigating ground-water releases from old landfills where existing monitoring wells are present, the investigator should sample the ground water in order to identify releases. The inspector should follow procedures outlined in the Technical Enforcement Guidance Document (TEGD) for sampling ground water. However, if existing monitoring wells are not located sufficiently near the landfill to provide meaningful data on releases, it may be necessary to take a number of soil samples around the unit and/or in the unsaturated zone beneath the landfill in order to obtain evidence of releases. There may be unusual situations where the investigator will need to drill new ground-water monitoring wells in order to obtain information on ground-water contamination. The investigator should be familiar with each of the potentially appropriate sampling techniques and choose the best one for each situation.

Format for Sampling Plan

The sampling plan should be clear and understandable and present logical actions for meeting the sampling objectives at each location of concern. The investigator should organize the sampling plan to identify the actions to be taken at the facility. Depending upon the facility characteristics, it may be appropriate to organize it by location or by sampling technique. For example, there could be sections for each unit describing all of the sampling activities associated with it; alternatively, there would be a section on soil sampling that identifies all the locations and methodologies for sampling the soil throughout the facility.

A complete sampling plan should include information on each of the following factors, even though some RCRA inspections may not require all of them:

- Field operation

  The sampling plan should discuss the sequence for conducting the field activities.

- Sampling locations/rationale

  As precisely as possible, the sampling plan should identify the location of each sample. A site map should be prepared to guide the investigator to the appropriate locations. Specific sampling methods, the number of samples, the parameters being sampled, and a description of the objectives for each sampling activity should be included in the sampling plan.

- Analytical requirements

  The sampling plan should discuss the technique and level of detection that will be used to analyze each sample.

- Sample handling

  Sample preservation and other handling practices should be described.

- Quality assurance/quality control

  The plan should identify the number and type of quality assurance samples, specifically the number of blanks, duplicates, or spikes that will be taken. The specific QA/QC guidelines to be followed in this program are to be stipulated by each Region.

- Equipment decontamination

  The sampling plan should identify the reagents and any special procedures associated with equipment decontamination.

- Chain-of-custody

  All samples collected (including blanks and spikes) must be maintained under chain-of-custody procedures. Chain-of-custody procedures minimize the potential for damaging or losing samples before they are analyzed. Chain-of-custody tracks the possession of a sample from the time of collection, through all transfers of custody, to the time it is received in the laboratory, where internal laboratory chain-of-custody procedures take over. Investigators should generally follow regional protocols for chain-of-custody procedures.

Use of Owner/Operator Sampling

The owner/operator is required to collect and analyze a variety of samples on a regular basis to meet regulatory requirements and permit conditions. A variety of factors affect the suitability of owner/operator sampling to support enforcement activities. Primary consideration should be given to the cooperativeness of the owner/operator in responding to problems at the facility and the technical ability of the owner/operator to conduct the sampling.

Areas of concern that may be addressed by enforcement action will generally require that EPA develops the sampling plan and conducts the sampling. Whenever the cooperation of the owner/operator is in question, existing monitoring information should be reviewed as a source of information; however, enforcement personnel should conduct the sampling. If the owner/operator is cooperative, the facility may do its own sampling. In using owner/operator data, EPA should carefully review the sampling and analysis plan and the technical capability of the owner/operator. For RFA activities, EPA personnel must be present for sampling activities to observe and document procedures used.

Identifying Indicators

Indicators may be useful in sampling efforts when they are properly used to support the information gathered by analyzing samples for specific constituents. Information that helps to document the conditions and properties of the media sampled increases the reliability of the data and ensures that appropriate investigative techniques are used. Measurement of parameters such as pH, turbidity and specific conductance helps to document the nature of the sample collection. In selecting indicator parameters for the sampling program, the investigator should consider the following points:

- Expected composition of the media sampled
- Sensitivity of samples to collection and analysis procedures
- Ambient conditions that may affect sample quality and reliability
- Type of analysis and regulatory standard for evaluation of compliance.

Where the representativeness of samples may be sensitive to sample collection procedures, the measurement of indicator parameters provides information on the stability of conditions during sampling. For example, when monitoring wells are purged before sample collection, the purging volume may be determined by continuous measurement of pH and specific conductance will show when water composition has stabilized and helps assure that purging has been sufficient to withdraw representative samples. When the available indicator parameters have been identified that may be used as indicators of ambient conditions or contamination, a sample screening methodology can be derived.

Screening Samples

Screening is not usually used in RCRA inspections, however, when there are limited resources to support sampling and analysis activities, a screening methodology may be used to select sampling locations to avoid collecting unnecessary samples.

The most important consideration in the use of sample screening is to be sure that the screening results in the selection of samples that will meet the objective of the program. For example, if a release is suspected for a highly toxic constituent with very low health-based standards, use of a screening technique that would allow analysis of grossly contaminated samples may cause the sampling and analysis to fail to detect significant contamination. If available information indicates a release at certain constituent levels, a screening technique appropriate for that level of contamination may be used.

When a screening technique based on an indicator parameter or characteristic measurement has been selected, the screening methodology must be integrated into the sampling and analysis plan. Screening can also be used to prioritize sample analyses.

If screening of samples is to be conducted during a sampling visit, logistics for the screening technique must also be fully specified including: trained personnel for equipment operation, documented calibration and decontamination procedures, and recording of results for all screening procedures.

Tracers and Dyes

A facility inspector may be confronted with questions of wastestream flows and operation of waste management units that must be assessed to determined facility compliance or to refine and modify the sampling strategy. An owner/operator may maintain that a waste management unit is a SWMU and not a regulated unit, but a variety of complex piping connections, valves and sumps may feed the unit. All of these may not be clearly identified on facility blueprints or engineering drawings. The inspector may wish to introduce a tracer into the system and observe the connections indicated by the flow of the tracer into units and discharge points. The Handbook for Monitoring Industrial Wastewater (USEPA, 1973) indicates the following dyes and tracers have been successfully used to track flow paths at industrial facilities. Many different dyes are available as tracers, such as methyl orange, nigrosine, flourescein or rhodamine "B". The usual procedure is to add about 10 grams of powdered dye to a bucket of water, mix, then pour the fluid into the sewer at the source of the waste. The path of flow is determined by observing the dye at man holes and outlets. Methyl orange is red in acid solutions and yellow in alkaline solutions. Nigrosine imparts a black color to acid and alkaline wastes. Flourescein sodium salt gives a brilliant green color in alkaline solution but gives no color in acid solution. Rhodamine "B" in high concentrations imparts a red color to the water but in low concentrations does not yield a visible color. It has the advantage, however, of being detected in extremely low concentrations by fluorometric techniques. Wood chips, cork floats, stoppered bottles, oranges, etc., are all usable floats for the determination of the flow path in a sewer.

3.3.1.2 Impromptu Sampling

In many cases, an inspector may be aware that sampling will be necessary at a particular site. In such instances, a sampling plan must be prepared before the inspection. However, during a sampling visit, conditions may be identified that justify the collection of additional samples. For example, a site visit has been planned to determine if a landfill at a facility has released constituents to groundwater. When the sampling crew arrives at the site, toe seepage from the base of the landfill is observed. By collecting surface water samples from the toe seepage, additional information can be obtained about the constituents that may be released by the landfill, and may also justify enforcement action to respond to the toe seepage and prevent surface water contamination.

The site inspector should anticipate the collection of additional samples when developing the sampling plan. Factors that should be considered in identifying areas of potential concern include, site conditions such as surface drainage and waste management practices such as container storage and transfer practices. If the additional sampling may be needed for areas identified during the site visit, the sampling plan should allow for these contingencies, including:

- Manpower and scheduling requirements for additional sampling
- Sample containers, QA/QC blanks and standards, shipping procedures, chain-of-custody and labels for additional samples
- Laboratory support and analytical capability for additional samples and media.

Additional areas of concern may be identified during the site visit that require specialized equipment and procedures for sampling. If the planned sampling can be adapted to allow for the additional sampling, the changes to the sampling plan should be carefully documented. Grab samples of soils or surface waters often require only that the proper sample containers be available. Areas of concern that require equipment such as a composite samplers or bailers will often have to be addressed by a separate sampling effort.

3.3.1.3 Sample Containers and Preservation

Sample containers must be selected to be compatible with the analyte class that each sample will be analyzed for. The TEGD provides the following guidance for container type and cleaning procedures.

When metals are the analytes of interest, fluorocarbon resin or polyethylene containers with polypropylene caps should be used. When organics are the analytes of interest, glass bottles with fluorocarbon resin-lined caps should be used. The plan should refer to the specific analytical method (in SW-846) that designates an acceptable container.

Containers should be cleaned based on the analyte of interest. When samples are to be analyzed for metals, the sample containers as well as the laboratory glassware should be thoroughly washed with non-phosphate detergent and tap water, and rinsed with (1:1) nitric acid, tap water, (1:1) hydrochloric acid, tap water, and finally Type II water, in that order.

Similarly, an EPA-approved procedure is available for cleaning containers used to store samples for organics analysis. The sampling container should be emptied of any residual materials, followed by washing with a non-phosphate detergent in hot water. It should then be rinsed with tap water, distilled water, acetone, and finally with pesticide-quality hexane. Dirty or contaminated glassware does not form a very thin sheet of water on its surface and may require treatment with chromic acid and/or baking in a muffle furnace at 400°C for 15 to 30 minutes to ensure that the glass is clean. Chromic acid may be useful to remove organic deposits from glassware; however, the analyst should be cautioned that the glassware must be thoroughly rinsed with water to remove the last traces of chromium. The use of chromic acid can cause a contamination problem and must be avoided if chromium is an analyte of interest.

Glassware should be sealed and stored in a clean environment immediately after drying or cooling to prevent any accumulation of dust or other contaminants. It should be stored capped with aluminum foil and inverted.

The cleanliness of a batch of precleaned bottles should be verified in the laboratory. The residue analysis should be available prior to sampling in the field.

All of these substantive requirements can be met by using containers from the Sample Bottle Repository Program, which is a service provided by the Contractor Laboratory Program. The types of containers and their recommended uses for are listed in Table 3-2.

Sample preservations should be added immediately after sample collection. The preservations used should be selected based on the analytical methods to be used on each sample. Preservatives should follow specifications for the analytical methods exactly, because these often have important impacts on matrix effects and instrument calibration for the analyses. Preserved samples should immediately be packed and shipped for analysis. Packing requirements assure minimal transformations of the samples in transit. Most sensitive parameter samples must be refrigerated and protected from light. Packing materials such as coolers and blue ice and numbers of samples per packing unit must be carefully selected to assure transit under proper conditions. The container, preservation and maximum holding time requirements for EPA-approved analytical methods are listed in Table 3-3.

Selection of Sample Containers for Hazardous Waste

The selection of appropriate waste sample containers plays an important role in preventing sampling problems.

The most important factors to consider when choosing containers for hazardous waste samples are compatibility with the waste, cost, resistance to breakage, and volume. Containers must not distort, rupture, or leak as a result of chemical reactions with constituents of waste samples. Thus, it is important to have some idea of the properties and composition of the waste.

TABLE 3-2. CONTAINERS AVAILABLE FROM THE SAMPLE BOTTLE REPOSITORY PROGRAM

Container Type	Description	No. Per Case	Expected Sample Type*
1	80 ounce amber glass bottle with PTFE-lined black phenolic cap	6	Extractable Organics Low Concentration Water Samples
2	40-ml glass via with PTFE-backed silicon septum cap	72	Volatile Organics Low and Medium Water Samples
3	1-liter high-density polyethylene bottle with poly cap	42	Metals, Cyanide Low Concentration Water Samples
4	120-ml wide-mouth glass	72	Volatile Organics Low and Medium Concentration Soil Samples
5	16-oz wide-mouth glass jar with PTFE-lined black phenolic cap	48	Metals, Cyanide Medium Concentration Water Samples
6	8-oz wide-mouth glass jar with PTFE-lined black phenolic cap	96	Extractable Organics Low and Medium Concentration Soil Samples and Dioxin Soil Samples and Organics and Inorganics High Concentration Liquid and Solid Samples
7	4-oz wide-mouth glass jar with PTFE-lined black phenolic cap	120	Extractable Organics Low and Medium Concentration Soil Samples and Metals, Cyanide Low and Medium Concentration Soil Samples and Dioxin Soil Samples and Organic and Inorganic High Concentrationd Liquid and Solid Samples
8	1-liter amber glass bottle with PTFE-lined black phenolic cap	30	Extractable Organics Low Concentration Water Samples
9	32-oz wide-mouth glass jar with PTFE-lined black phenolic cap	36	Extractable Organics Medium Concentration Water Samples

*This column specifies the only type(s) of samples that should be collected in each container.

TABLE 3-3. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Name	Container[1]	Preservation	Maximum Holding Time
Bacterial Tests:			
Coliform, fecal and total	P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
Fecal streptococci	P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$	6 hours
Inorganic Tests:			
Acidity	P,G	Cool, 4°C	14 days
Alkalinity	P,G	Cool, 4°C	14 days
Ammonia	P,G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Biochemical oxygen demand	P,G	Cool, 4°C	48 hours
Bromide	P,G	None required	28 days
Biochemical oxygen demand, carbonaceous	P,G	Cool, 4°C	48 hours
Chemical oxygen deman	P,G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Chloride	P,G	None required	28 days
Chlorine, total residual	P,G	None required	Analyze immediately
Color	P,G	Cool, 4°C	48 hours
Cyanide, total and amendable to chlorination	P,G	Cool, 4°C, NaOH to pH>12, 0.6g ascorbic acid	14 days
Fluoride	P	None required	28 days
Hardness	P,G	HNO_3 to pH<2, H_2SO_4 to pH<2	6 months
Hydrogen ion (pH)	P,G	None required	Analyze immediately
Kjeldahl and organic nitrogen nitrogen	P,G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Metals:			
Chromium VI	P,G	Cool, 4°C	24 hours
Mercury	P,G	HNO_3 to pH<2	28 days
Metals, except chromium VI and mercury	P,G	HNO_3 to pH<2	6 months
Nitrate	P,G	Cool, 4°C	48 hours
Nitrate-nitrite	P,G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Nitrite	P,G	Cool, 4°C	48 hours
Oil and grease	G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Organic carbon	P,G	Cool, 4°C, HCl or H_2SO_4 to pH<2	28 days
Orthophosphate	P,G	Filter immediately, cool, 4°C	48 hours
Oxygen, Dissolved Probe	G Bottle and top	None required	Analyze immediately
Winkler	do	Fix on site and store in dark	8 hours
Phenols	G only	Cool, 4°C, H_2SO_4 to pH<2	28 days
Phosphorus (elemental)	G	Cool, 4°C	48 hours
Phosphorus, total	P,G	Cool, 4°C, H_2SO_4 to pH<2	28 days
Residue, total	P,G	Cool, 4°C	7 days
Residue, Filterable	P,G	Cool, 4°C	7 days
Residue, Nonfilterable (TSS)	P,G	Cool, 4°C	7 days
Residue, Settleable	P,G	Cool, 4°C	48 hours
Residue, volatile	P,G	Cool, 4°C	7 days
Silica	P	Cool, 4°C	28 days

TABLE 3-3. REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES (Continued)

Name	Container[1]	Preservation	Maximum Holding Time
Metals (Continued):			
Specific conductance	P,G	Cool, 4°C	28 days
Sulfate	P,G	Cool, 4°C	28 days
Sulfide	P,G	Cool, 4°C, add zinc acetate plus sodium hydroxide to pH>9	7 days
Sulfite	P,G	None required	Analyze immediately
Surfactants	P,G	Cool, 4°C	48 hours
Temperature	P,G	None required	Analyze
Turbidity	P,G	Cool, 4°C	48 hours
Organic Tests:			
Purgeable Halocarbons	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$	14 days
Purgeable aromatic	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$, HCl to pH2	14 days
Acrolein and acrylonitrile	G, Teflon-lined septum	Cool, 4°C, 0.008% $Na_2S_2O_3$, Adjust pH to 4-5	14 days
Phenols	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction, 40 days after extraction
Benzidines	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction 40 days after extraction
Phthalate esters	G, Teflon-lined cap	Cool, 4°C	7 days until extraction 40 days after extraction
Nitrosamines	G, Teflon-lined cap	Cool, 4°C, store in dark, 0.008% $Na_2S_2O_3$	7 days until extraction 40 days after extraction
PCBs, acrylonitrile	G, Teflon-lined cap	Cool, 4°C	7 days until extraction 40 days after extractic
Nitroaromatics and isophorone	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$ store in dark	7 days until extraction 40 days after extraction
Polynuclear aromatic hydrocarbons	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$ store in dark	7 days until extraction 40 days after extraction
Haloethers	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction 40 days after extraction.
Chlorinated hydrocarbons	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction 40 days after extraction
TCDD	G, Teflon-lined cap	Cool, 4°C, 0.008% $Na_2S_2O_3$	7 days until extraction 40 days after extraction
Total organic halogens	G, Teflon-lined cap	Cool, 4°C, H_2SO_4 to pH<2	7 days until extraction 40 days after extraction
Pesticides Tests:			
Pesticides	G, Teflon-lined cap	Cool, 4°C, pH 5-9	40 days after extraction
Radiological Tests:			
Alpha, beta and radium	P,G	HNO_3 to pH<2	6 months

[1]Polyethylene (P) or Glass (G)

(Source: Test Methods for Evaluating Solid Waste (SW-846))

The containers must have adequate wall thickness to withstand handling during sample collection and transport to the laboratory. Containers with wide mouths are often desirable to facilitate transfer of samples from samplers to containers. Also, the containers must be large enough to contain the optimum sample volume (EPA, 1986 Field Monitoring and Analysis and Hazardous Methods Training Manual).

Containers for collecting and storing hazardous waste samples are usually made of plastic or glass. Plastics that are commonly used to make the containers include high-density or linear polyethylene (LPE), conventional polyethylene, polypropylene, polycarbonate, Teflon FEP (fluorinated ethylene propylene), polyvinyl chloride (PVC), or polymethylpentene. Teflon FEP is almost universally usable due to its chemical inertness and resistance to breakage. However, its high cost severely limits its use. LPE, on the other hand, usually offers the best combination of chemical resistance and low cost when samples are to be analyzed for inorganic parameters (EPA, 1986). Table 3-4 lists sample containers and closures recommended for various waste types.

Glass containers are relatively inert to most chemicals and can be used to collect and store almost all hazardous waste samples, except those that contain strong alkali and hydrofluoric acid. Borosilicate glass containers, such as Pyrex and Corex, are more inert and more resistant to breakage than soda glass, but are expensive and not always readily available. Glass containers are generally more fragile and much heavier than plastic containers. Glass or FEP containers must be used for waste samples that will be analyzed for organic compounds.

The containers must have tight, screw-type, Teflon lids. Plastic bottles are usually provided with screw caps made of the same material as the bottles. Buttress threads are recommended. Cap liners are not usually required for plastic containers. Teflon cap liners should be used with glass containers supplied with rigid plastic screw caps. (These caps are usually provided with waxed paper liners.) Other liners that may be suitable are polyethylene, polypropylene, and neoprene plastics.

TABLE 3-4. SAMPLE CONTAINERS AND CLOSURES RECOMMEND FOR VARIOUS TYPES OF WASTE

Waste Type Item	Recommended Container	Recommended Closure
Oil wastes except pesticides, HC, chlorinated HC, and photosensitive wastes	Linear polyethylene (LPE) bottles,[a] 1000-and 2000-ml(1-qt. and 1/2-gal.), wide mouth	LPE caps
Pesticides, HC, and chlorinated HC	Glass bottles,[b] wide-mouth, 1000-and 2000-ml (1-qt. and 1/2-gal.).	Bakelite caps with Teflon liner[c]
Photosensitive wastes	Amber LPE or brown glass[d] bottles, wide-mouth, 1000-and 200-ml (1-qt. and 1/2-gal.)	LPE caps for the LPE bottles; Bakelite caps with Teflon liner for the glass bottles

[a]Nalgene, Cat. Nos. 2104-0032 and 2120-0005, or equivalent.

[b]Scientific Products, Cat. Nos. 87519-32 and B7519-64, or equivalent.

[c]Available from Scientific Specialities, P.O. Box 352, Randallstown, Md.

[d]Scientific Products, Cat. Nos. B75280-050 and 7528-2L, or equivalent.

Source: deVera, et al 1980.

If the samples are to be submitted for analysis of volatile compounds, the samples must be sealed in air-tight containers.

3.3.1.4 Decontamination

Sampling personnel should assume that sampling equipment, either new or used, is contaminated and, therefore, should be decontaminated according to the procedures appropriate for its construction and intended use. The decontamination of equipment should be performed at the laboratory of the sampling team prior to the inspection. However, if appropriate equipment blanks are collected after field decontamination procedures, then sampling equipment can be used more than once in the field before laboratory decontamination.

The decontaminated equipment should be packaged to protect it from dust. Aluminum foil is preferred for wrapping the decontaminated equipment. Plastic bags can be used to hold larger items, such as bailers and bladder pumps, after they are wrapped in aluminum foil. A label stating the level of decontamination, date of decontamination, and initials of individual certifying and decontamination should be attached to the protective package in such a way that the label will not be torn during unpackaging. A piece of equipment in a package with a torn label should not be used for sampling and should be considered as contaminated.

Field decontamination of sampling equipment should be performed only under extenuating circumstances such as logistical considerations and shortage of dedicated sampling equipment. When field decontamination cannot be avoided, the following general rules should be adhered to:

- No equipment should be decontaminated in the field more than once between laboratory decontamination
- Equipment used to collect hazardous waste samples must be decontaminated before it can be used to collect higher level environmental samples. In general, any decontaminated equipment should only be used to collect samples of "lower quality" than the first sample collected
- All decontamination and subsequent use of decontaminated equipment should be documented in a field logbook

- Equipment should never be reused if visual signs, such as discoloration indicate that decontamination was insufficient.

Decontamination of small sampling tools, such as soil scoops and containers, is not required if the equipment is properly disposed of after use. Disposable sampling tools and waste products from field decontamination, such as waste rinse water and waste solvent, should be properly disposed of on-site in accordance with the disposal procedures of the facility or should be packaged for off-site disposal.

The following sections detail the procedures for the five general levels of lab decontamination and field decontamination of field equipment, pumps, bailers and compositing containers.

Level 1 Decontamination (Lab decontamination)

The following decontamination procedures are suitable for glassware and stainless steel equipment that are used for the collection and containerization of organic samples and that can tolerate high temperatures generated by a muffle furnace.

- Wash thoroughly with non-phosphate detergent in hot water
- Rinse several times with tap water
- Rinse several times with reagent grade distilled/deionized water
- Rinse once with acetone
- Rinse once with pesticide grade hexane
- Place in muffle furnace at 450°C for 15 to 30 minutes
- Allow to cool; protect from dust and other contaminants by sealing or covering with aluminum foil.

Level 2 Decontamination (Lab decontamination)

The following decontamination procedures are suitable for PTFE equipment and stainless steel equipment that are used for collection of organic samples and that cannot withstand the high temperatures of the muffle furnace.

- Wash thoroughly with non-phosphate detergent in hot water
- Rinse several times with tap water
- Rinse several times with reagent grade distilled/deionized water
- Rinse once with acetone
- Rinse once with pesticide grade hexane
- Air dry in hood
- Cap or cover after drying; fluorocarbon resin bailers and other applicable equipment should be wrapped in aluminum foil and then placed in plastic bags.

NOTE: Chromic acid can be used to remove persistent organic deposits. This is never used for metal sample containers.

Level 3 Decontamination (Lab decontamination)

The following decontamination procedures are suitable for sample containers used to store metal samples.

- Wash thoroughly with non-phosphate detergent in hot water
- Rinse once with 1:1 nitric acid
- Rinse several times with tap water
- Rinse once with 1:1 hydrochloric acid
- Rinse several times with tap water
- Rinse several times with reagent grade distilled/deionized water
- Invert and air dry in dust-free environment
- Cap after drying; use aluminum foil.

NOTE: If chromic acid is used as cleaning agent, rinsing must be increased. Note the use of chromic acid on bottle box seal.

Level 4 Decontamination (Field decontamination)

The following procedures are suitable for decontaminating safety equipment such as respirators, boots, and gloves that are susceptible to degradation by solvent rinsing.

- Brush off loose dirt with soft bristle brush or cloth.
- Rinse thoroughly with tap water.
- Wash in non-phosphate detergent in warm water.
- Rinse thoroughly with tap water.
- Rinse thoroughly with reagent grade distilled/deionized water.
- Air dry in dust-free environment; keep articles out of the sun.
- Store in plastic bags.

Level 5 Decontamination (Field decontamination)

The following procedures are suitable for decontaminating ancillary equipment such as ropes, extension cords, generators, hand carts, and field sampling equipment to be returned to the laboratory for decontamination.

- Brush off loose dirt with stiff bristle brush
- Rinse off with high pressure water
- Air dry.

Field Decontamination of Pumps

- Submerge pumps in a non-phosphate detergent solution such as Alconox*
- Operate pump for a minimum of 10 minutes; recycle the soap solution to a wash basin through an entire length of hose when the hose must be reused
- Clean all exterior surfaces of both tubing and pump with bristle brush and clean cloth
- Submerge pump in tap water
- Operate pump for a minimum of 10 minutes; recycle the water to rinse basin through an entire length of hose
- Submerge pump in reagent grade distilled/deionized water
- Pump the deionized water to the rinse basin for disposal (do not recycle deionized water)
- Repeat steps 6 and 7 two times

*References to Alconox in this report are for illustration only; they do not imply endorsement by the U.S. Environmental Protection Agency.

- Place pump and hose on rack to air dry
- Wrap pump and hose in aluminum foil and then place the equipment in a plastic bag; seal bag and place a label on the bag indicating date of decontamination.

Field Decontamination of Bailers

- Disassemble both top and bottom check valve assemblies
- Clean all component parts in non-phosphate detergent solution using a bristle brush and a bottle brush to clean inside surfaces
- Rinse all surfaces five times with tap water
- Rinse all surfaces twice with pesticide grade hexane
- Rinse all surfaces five times with reagent grade distilled/deionized water
- Place all components on rack and allow to air dry
- Wearing clean surgical gloves (powderless), reassemble bailer
- Wrap bailer in aluminum foil and place it in a plastic bag; seal and label the bag indicating date of decontamination.

3.3.1.5 Chain-of-Custody and Sample Labeling

Each sample shipment must be accompanied by a Chain-of-Custody Record identifying its contents. The original record should accompany the shipment, and a copy should be retained by the sampling team. Chain-of-Custody requirements are extensively described in numerous documents such as "Enforcement Considerations for Evaluations of Uncontrolled Hazardous Waste Disposal Sites by Contractors" (U.S. EPA, 1980). Preferably, as few people as possible should handle the samples; until shipped or transferred, sample custody should be the responsibility of the sampling team leader.

The remarks section of the custody form must note when samples are split with an owner/operator. The note should indicate with whom the samples are being split and be signed by both the sampler and recipient. If the split is refused, the form must be so noted and signed by both parties. The person relinquishing the samples to the owner/operator must request the signature of a representative of the appropriate party acknowledging receipt of the samples. If a representative is unavailable or refuses to sign, it must be noted in the "Remarks" space. When appropriate, as in the case where a representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time.

Specialized chain-of-custody records should be assigned and accounted for in a manner similar to that for the sample tags. When samples are transferred from a field sampling person or courier to laboratory personnel, the recipient, after signing, retains the original custody record and files it in accordance with procedures. A copy of the custody record should be returned to the sampling team leader or to the designated document control officer.

A copy of the commonly used U.S. EPA Chain-of-Custody Form is shown as Figure 3-1.

Labeling and Packaging

All samples collected should be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. Sample labels should be waterproof, and have a pre-assigned unique number that is indelible, date of collection, parameter analysis required, and amount and type of any preservative added to the sample. Preferably, a two-part label should be used so that the sample identification number can be affixed to the sample bottle and can also be entered in a field logbook at the time of collection. The label to be attached to the bottle may list only the sample number; the label for the notebook should include the sample number and the following information:

- Project code number
- Station location and number
- Date and time
- Sample type (composite or grab)
- Signature of sampler
- Preservative indication (yes or no; type)
- Analyses required
- Additional remarks.

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME					NO. OF CONTAINERS							REMARKS
SAMPLERS: *(Signature)*													
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time	Remarks	

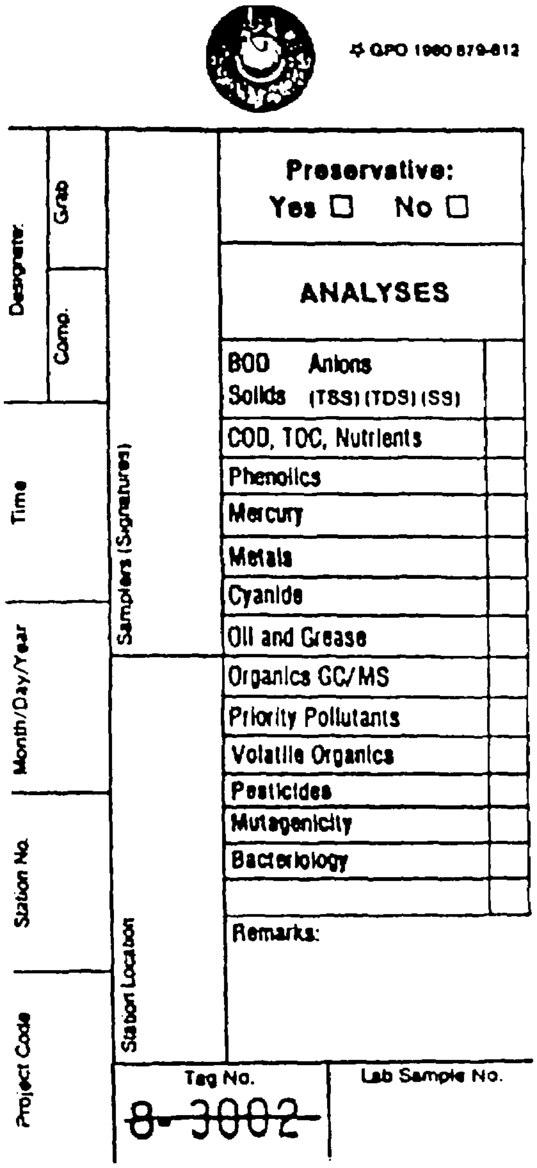
Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

FIGURE 3-1 CHAIN-OF-CUSTODY FORM

An example of the sample label is shown as Figure 3-2. Samples should be packaged properly for shipment and dispatched to the appropriate laboratory for analysis. A separate custody record should accompany each shipment. Shipping containers should be padlocked or sealed for shipment to the laboratory. Only metal or plastic ice chests should be used as the outside shipping container for routine environmental samples. The outside shipping container must be able to withstand a 4-foot drop on solid concrete in the position most likely to cause damage. The drainage hole at the bottom of each ice chest should be permanently plugged to prevent any possibility of leakage through the hole. Each ice chest must be clearly marked with arrows indicating the proper upright position.

The following sections of Part 3.3 provide information and guidance for sampling in various media. The sections presented are:

Section 3.3.2 Groundwater Sampling
Section 3.3.3 Wastewaters and Surface Water
Section 3.3.4 Air Surveillance
Section 3.3.5 Waste Sampling.


☆ GPO 1980 679-612

Designate: Grab | Comp.

Time

Month/Day/Year

Station No.

Project Code

Samplers (Signatures)

Station Location

Preservative:
Yes ☐ No ☐

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	
Priority Pollutants	
Volatile Organics	
Pesticides	
Mutagenicity	
Bacteriology	

Remarks:

Tag No. 8-3002

Lab Sample No.

FIGURE 3-2. SAMPLE LABEL

3.3.2 Ground-water Sampling

The proper collection of groundwater samples can provide reliable data for enforcement actions addressing ground-water contamination. To collect accurate and precise ground-water quality data, the investigator must carefully complete the sampling activities and carefully document all steps taken in the collection of samples. When the objectives of the ground-water sampling effort have been identified (the wells to be sampled and the analytes of interest), the sampling protocol for collection of ground-water data can be developed. Steps that must be taken for reliable ground-water monitoring include:

- Fluid level measurements/immiscible phase sampling (Section 3.3.2.1)
- Well purging (Section 3.3.2.2)
- Sample collection and field parameter measurements (Section 3.3.2.3)
- Sample preservation (Section 3.3.2.4)
- Decontamination of non-dedicated equipment (Section 3.3.2.5).

The selection of materials and procedures for each of these activities affects the accuracy of results obtained from the sampling, and should be selected based on the objectives of sampling and anticipated site conditions. The Technical Enforcement Guidance Document can be used as good sourcebook for details on ground-water sampling.

3.3.2.1 Fluid Level Measurements and Sampling of Immiscible Phases

The following discussion of fluid level measurements and non-aqueous phase sampling is adopted from the Technical Enforcement Guidance Document (EPA, 1986a).

Measurement of Static Water Level Elevation

The static water elevations in each well should be measured prior to each sampling event. Collection of water elevation data is important to determine hydraulic conditions during sampling.

The field measurements should include depth to standing water and total depth of the well to the bottom of the intake screen structure. This information is required to calculate the volume of stagnant water in the well and provide a check on the integrity of the well (e.g., identify siltation problems). The measurements should be taken to 0.01 foot. Each well should have a permanent, easily identified reference point from which its water level measurement is taken. The device used to detect the water level surface must be sufficiently sensitive so that a measurement to $\pm$.01 foot can be obtained reliably. A steel tape will usually suffice; however, it is recommended that an electronic device (e.g., M-Scope) be used to measure depth to the surface of the groundwater or light phase immiscibles. Whenever non-dedicated equipment is used, procedures need to be instituted to ensure that the sample is not contaminated. Equipment should be constructed of inert materials and decontaminated prior to use at another well.

Detection of Immiscible Layers

The sampling plan should include provisions for detecting immiscible contaminants (i.e., "floaters" and sinkers") where they would not be detected in an aqueous phase if the owner/operator manages wastes of this type at his facility. "Floaters" are those relatively insoluble organic liquids that are less dense than water and which spread across the potentiometric surface. "Sinkers" are those relatively insoluble organic liquids that are more dense than water and tend to migrate vertically through the sand and gravel aquifers to the underlying confined layer. The detection of these immiscible layers requires specialized equipment that must be used before the well is evacuated for conventional sampling. The device selected for detection of immiscible phases must be carefully operated following the manufacturer's instructions.

EPA or State personnel should follow the procedures below for detecting the presence of light and/or dense phase immiscible organic layers. These procedures should be undertaken before the well is evacuated for conventional sampling:

- Remove the locking and protective caps
- Sample the air in the well head for organic vapors using either a photoionization analyzer or an organic vapor analyzer, and record measurements
- Determine the static liquid level and record the depth
- Determine the existence of any immiscible layer(s), light and/or dense.

The approach to collecting light phase immiscibles is dependent on the depth to the surface of the floating layer and the thickness of that layer. The immiscible phase must be collected prior to any purging activities. If the thickness of this phase is 2 feet or greater, a bottom valve bailer is the equipment of choice. The bailer should be lowered slowly until contact is made with the surface of the immiscible phase, and lowered to a depth less than that of the immiscible/water interface depth as determined by preliminary measure with the interface probe.

When the thickness of the floating layer is less than 2 feet, but the depth to the surface of the floating layer is less than 25 feet, a peristaltic pump can be used to "vacuum" a sample.

When the thickness of the floating layer is less than 2 feet and the depth to the surface of the floating layer is beyond the effective "reach" of a peristaltic pump (greater than 25 feet), a bailer must be modified to allow filling only from the top. Sampling personnel should disassemble the bottom check valve of the bailer and insert a piece of 2-inch diameter fluorocarbon resin sheet between the ball and ball seat. This will seal off the bottom valve. The ball from the top check valve should be removed to allow the sample to enter from the top. The buoyancy that occurs when the bailer is lowered into the floater can be overcome by placing a length of 1-inch stainless steel pipe (304, 316, 2205) on the retrieval line above the bailer (this pipe may have to be notched to allow sample entry if the pipe remains within the top of the bailer). The device should be lowered carefully, measuring the depth to the surface of the floating layer, until the top of the bailer is level with the top of the floating layer. The bailer should be lowered an additional one-half thickness of the floating layer and the sample collected. This technique is the most effective method of collection if the floating phase is only a few inches thick.

The best method for collecting dense phase immiscibles is to use a double check valve bailer. This type of bailer has a value on either end such that it can be lowered through the lighter layers without displacing the heavy layer to be sampled. When the bailer is pulled back up the lower check valve opens, allowing the bailer to be filled from the bottom with water in heavier layer. The key to sample collection is controlled, slow lowering (and raising) of the bailer to the bottom of the well. The dense phase must be collected prior to any purging activities.

3.3.2.2 Well Purging

A variety of investigations have shown that the stagnant water in the well casing is often not representative of aquifer conditions, especially with respect to the concentrations of hazardous constituents (USEPA, 1986a; USEPA, 1985). This volume of water must be removed from the well before representative samples can be obtained. The well purging procedure must be based on the hydraulic conditions of the well, including:

- Volume of water in the casing
- Well diameter and depth
- Tranmissivity of the screened interval.

The well purging procedures should have been developed for site conditions by the owner/operator. If these procedures are suspected of causing sample bias, the purging volumes and rates should be redetermined. For high yield wells (those capable of yielding more than 3 casing volumes), at least 3 well casings plus the saturated annulus should be purged before sample collection is initiated (TEGD). Well volumes can be estimated from the following:

Casing inside diameter (inches)	Volume of water		
	(Fluid oz.) [$V=5.22(I.D.)^2$]	(Gallons) [$V=0.0408(I.D.)^2$]	(Milliliters [$V=154.4(I.D.)^2$]
1	5.22	0.04	154.4
1 1/2	11.74	0.09	347.3
2	20.88	0.16	617.5
3	46.98	0.37	1389.4
4	83.52	0.65	2470.0

Source: USEPA, 1986 Protocol for Groundwater Evaluations, Hazardous Waste Groundwater Task Force, OSWER.

The volume of water in the well is based on the formula:

$$V = \frac{\pi D^2 \times L}{4}$$

where

D = the inside diameter of the well

L = the depth of the water in the well

V = the volume of water in the well

For low-yield wells, the well should be evacuated to dryness and sampled as soon as sufficient recovery has occurred to obtain a sample (TEGD).

In-line monitoring of purge water pH and conductivity are useful indicators to the stability of sample composition. Changes of less than 10% between well volumes removed is a good indicator of ground-water quality representative of aquifer conditions (TEGD). This procedure is, however, difficult to accomplish in the field.

Because materials introduced into the well may interact with the water (for example, desorbing or adsorbing constituents), inert materials must be used for purging equipment, including fluorocarbon resins, stainless steel 316, 304 or 2205. Positive-gas-displacement bladder pumps are preferred, as these can be operated to minimize aeration and agitation of water within the well (TEGD). Where these are unavailable, peristaltic pumps, gas-lift pumps or centrifugal pumps may be used if well conditions are allowed to stabilize before sampling. Where dedicated equipment is installed in wells for purging, these must meet the inert material and flow conditions described above. If inflatable packers are used to reduce purge volumes, these must be constructed of inert materials and carefully operated.

3.3.2.3 Sample Collection and Field Parameter Measurements

Sample withdrawal and transfer to containers must be performed very carefully to prevent alteration of sensitive analytes in the samples. The following discussion from the TEGD reviews acceptable sample withdrawal practices.

The technique used to withdraw a ground-water sample from a well should be selected based on a consideration of the parameters to be analyzed in the sample. To ensure the ground-water sample is representative of the formation, it is important to minimize physically altering or chemically contaminating the sample during the withdrawal process. In order to minimize the possibility of sample contamination, the sampling personnel should:

- Use only fluorocarbon resin or stainless steel sampling devices.
- Use dedicated samplers for each well. (If a dedicated sampler is not available for each well, the owner/operator should thoroughly clean the sampler between sampling events, and should take blanks and analyze them to ensure cross-contamination has not occurred. Decontamination methods are discussed in Section 3.3.1. The rinsewater generated from decontamination should be regarded as a hazardous waste.)

The sampling plan should specify the order in which samples are to be collected. Samples should be collected and containerized in the order of the volatilization sensitivity of the parameters. A preferred collection order for some common ground-water parameters follows:

- Volatile organics (VOA)
- Purgeable organic carbon (POC)
- Purgeable organic halogens (POX)
- Total organic halogens (TOX)
- Total organic carbon (TOC)
- Extractable organics
- Total metals
- Dissolved metals
- Phenols
- Cyanide
- Sulfate and chloride
- Turbidity
- Nitrate and ammonia
- Radionuclides.

Temperature, pH, and specific conductance measurements should be made in the field before and after sample collection as a check on the stability of the water sampled over time.

Equipment and procedures that minimize sample agitation and reduce/ eliminate contact with the atmosphere during sample transfer must be used. When used properly, the following are acceptable sampling devices for all parameters:

- Gas-operated, fluorocarbon resin or stainless steel squeeze pump (also referred to as a bladder pump with adjustable flow control
- Bailer (fluorocarbon resin or stainless steel), provided it is equipped with double check valves and bottom emptying device
- Syringe bailer (stainless steel or fluorocarbon resin)
- Single check valve fluorocarbon resin or stainless steel bailer.

Sampling equipment should be constructed of inert material. Equipment with neoprene fittings, PVC bailers, tygon tubing, silicon rubber bladders, neoprene impellers, polyethylene, and viton is not acceptable. If bailers are used, an inert cable/chain (e.g., fluorocarbon resin-coated wire, single strand stainless steel wire, disposable nylon rope) should be used to raise and lower the bailer.

While in the field, the sampling personnel ensure that:

- Positive gas displacement bladder pumps are operated in a continuous manner so that they do not produce pulsating samples that are aerated in the return tube or upon discharge
- Check valves are inspected to assure that fouling problems do not reduce delivery capabilities or result in aeration of the sample
- Sampling equipment (e.g., especially bailers) should never be dropped into the well, because this will cause degassing of the water upon impact
- The contents are transferred to a sample container in a way that will minimize agitation and aeration
- Clean sampling equipment is not placed directly on the ground or other contaminated surfaces prior to insertion into the well.

When collecting samples where volatile constituents or gases are of interest using a positive gas displacement bladder pump, pumping rates should not exceed 100 milliliters/minute. Higher rates can increase the loss of volatile constituents and can cause fluctuation in pH and pH-sensitive analytes. Once the portions of the sample reserved for the analysis of volatile components have been collected, the owner/operator may use higher pumping rate, particularly if a large sample volume must be collected. The sampling flow rate should not exceed the flow rate used while purging.

Table 3-5 indicates the suitability of different types of sample withdrawal equipment for analysis of various classes of analytes. More detailed technical guidance on the operation of purging and sampling devices may be obtained from Practical Guide for Ground-Water Sampling (EPA/600/2-85/104, September 1985). The manufacturer's documentation should be carefully reviewed and personnel should have previous field experience with all equipment used to withdraw samples and purged water from the monitoring wells.

The TEGD also recommends the measurement of field parameters before and after sample withdrawals to provide indications on the stability of conditions in the well. If large differences are found in these parameters, sampling conditions should be reviewed to determine possible causes of instability. Purging or sample withdrawal strategies may need to be modified to reduce variability of conditions that may reflect alteration of samples. The following recommendations from TEGD should be followed for the measurement of field parameters.

Several constituents of the parameters being evaluated are physically or chemically unstable and must be tested either in the borehole using a probe (in-situ) or immediately after collection using a field test kit. Examples of unstable elements or properties include pH, redox potential, chlorine, dissolved oxygen, and temperature. Although specific conductivity (analogous to electrical resistance) of a substance is relatively stable, it is recommended that this characteristics be determined in the field. Most conductivity instruments require temperature compensation; therefore, the temperature of the samples should be measured at the time conductivity is determined. If the owner/operator uses probes (pH electrode, specific ion electrode,

TABLE 3-5. MATRIX OF SENSITIVE CHEMICAL CONSTITUENTS AND VARIOUS SAMPLING MECHANISMS

---------------- INCREASING RELIABILITY OF SAMPLING MECHANISMS

INCREASING SAMPLE SENSITIVITY

Type of Constituent	Example of Constituent	Positive Displacement Bladder Pumps	Thief, In Situ or Dual Check Valve Bailers	Mechanical Positive Displacement Pumps	Gas-Drive Devices	Suction Mechanisms
Volatile Organic Organometallics	Chloroform TOX CH_3Hg	Superior Performance	May be adequate if well purging is assured	May be adequate if design and operation are controlled	Not recommended	Not recommended
Dissolved Gases Well-Purging Parameters	O_2, CO_2 pH, Q^{-1} Eh	for	May be adequate if well purging is assured	May be adequate if design and operation are controlled	Not recommended	Not recommended
Trace Inorganic Metal Species Reduced Species	Fe, Cu No_2^-, $S^=$	most	May be adequate if well purging is assured	Adequate	May be adequate	May be adequate if materials are appropriate
Major Cations & Anions	Na^+, K^+, Ca^{++} Mg^{++} Cl^-, $SO_4^=$	Applications	May be adequate if well purging assured	Adequate	Adequate	Adequate

Source: Practical Guide for Ground-Water Sampling (EPA 600/2-85/104, September, 1985) thermistor) to measure any of the above properties, it is important that this is done on water samples taken after well evacuation and after any samples for chemical analysis have been collected, so that the potential for probe(s) to contaminate a sample designated for laboratory analysis is minimized. Monitoring probes should not be placed in shipping containers containing ground-water samples for laboratory analysis.

The calibration of any in-situ monitoring equipment or field-test probes should be completed and checked at the beginning of each use, according to the manufacturers' specifications and consistent with Test Methods for Evaluating Solid Waste - Physical/Chemical Methods (SW-846).

Sample Handling

The transfer of samples from the withdrawal device (pump outlet or bailer) to the sample containers should be performed with minimal possibilities for sample disturbance or contamination. All personnel must change disposable gloves between wells and care must be taken to prevent surface contamination (for example, from windblown particulates). Samples collected for gas-sensitive analytes (volatiles, purgeable organics and reduced species) must be collected to minimize aeration and agitation of the samples. The following discussion from Practical Guide for Ground-Water Sampling should be followed.

Although no significant error has been reported for gas-sensitive constituents pumped with a positive displacement bladder device when air is used as the drive gas, it may be prudent to switch the drive gas from air to N_2 for collection of gas-sensitive samples.

The samples for dissolved gases, volatile organic constituents, TOC and TOX are taken by carefully slowing the delivery rate to 100 mL/min or less and directing the flow to the bottom of the sample vessel (e.g., or by flowing into a syringe of appropriate volume) and allowing the vessel to overflow at least 1.5 volumes. Samples from bailers should be delivered to the sample containers from outlet devices at the bailer bottom that allow a steady flow to minimize aeration.

Decontamination of Non-Dedicated Equipment

An important aspect of the sampling activities is the decontamination of all equipment that is introduced into the wells for fluid level measurements, well purging and sample withdrawal. Field blanks collected at each will provide quality assurance on decontamination procedures. Proper decontamination is critical to the reliability of data collected at the sampling event, and to the collection of data from the wells at future sampling events. An important consideration for equipment decontamination and prevention of cross contamination is the order of well sampling. Based on available information, wells that are suspected of being grossly contaminated should be sampled last and wells where low levels of contaminants may occur should be sampled early in the sampling visit. All non-dedicated equipment must be decontaminated by one of the procedures described in Section 3.3.1.4.

3.3.3 Sampling Wastewaters and Surface Waters

In this section information is presented on four separate aspects particularly pertaining to water sampling. These being: (1) elements of a sampling plan (Section 3.3.3.1) which compliments Section 3.3.1.1; (2) estimation of flow (Section 3.3.3.2); (3) selection and preparation of containers (Section 3.3.3.3), and (4) Sampling equipment (Section 3.3.3.4). Section 3.3.3.3 does not include a separate section on sample preservation; the reader is referred back to Tables 3-2 and 3-3 for this information.

3.3.3.1 Elements of a Sampling Plan for Wastewaters and Surface Water

The development of a sampling plan is an activity that should be accomplished to a great extent before the inspector leaves the office, based on documentation available, and the inspector's knowledge of the site (see Part 2, Pre-Inspection). While this early planning will be useful in determining the types of equipment that are necessary, some flexibility must be maintained (for example, with respect to the exact sampling locations) to accommodate field conditions that are encountered.

In general, sampling plans for wastewaters and surface waters should include the following:

- Identification of Sampling Locations - based on the inspector's review of flow diagrams and other available information, and possibly consultation with the owner/operation. In choosing a sampling location, the inspector needs to be certain that data derived from that location will provide the data that is sought. Usually this means that the sample must accurately represent the character of the wastewater or waterbody. To achieve this goal the inspector must select the correct locations, and sample type, analyze the sample for relevant parameters, and handle the sample in an appropriate fashion. Each of these aspects are discussed below.

- Sample Types - which the inspector shall use to characterize a wastewater (either grab samples or composite samples). Each type of sample is appropriate depending on the data that are needed.

  Grab samples - are individual samples collected over a period of time not exceeding 15 minutes. This type of sample is representative of the conditions that exist at the moment that the sample is taken, and is not representative of conditions at any other time. An appropriate use of grab samples is to check for highly variable conditions. For example if wide fluctuations in pH are expected, a series of grab samples may be able to detect the changes, whereas composite samples would serve to dampen out extreme values. Grab samples should be used where long sampling periods (encountered in composite sampling) could allow for changes to the sample, possibly through biodegradation, or chemical or physical interactions. Parameters for which this is a concern include: phenols, cyanide, pH, and volatile organics. In sampling wastewaters, the most desirable type of location is in an area of turbulence as the wastewater will be well mixed. Skimming the surface, or dragging the bottom of an open canal should be avoided. The inspector should take samples from the center of the flow, with the container facing upstream. By facing the container upstream the inspector avoids possible sample contamination that could occur if the wastestream washed over the outside of the container, and into the container. Wide conduits may require dye testing to determine the most representative sampling sites. Once the site is determined, samples should be drawn from a depth of 40 to 60 percent of the total wastewater depth.

Composite samples - are samples that are collected over time, formed either by continuous sampling or by mixing discrete samples. A composite sample should reflect the average characteristics of the wastestream during the compositing period. The analytical results of a composite sample yield the average pollutant parameter concentration in the wastestream during the period of compositing. The two most common types of compositing encountered are; time proportional composites, and flow proportional composites. Both of these types of compositing involve the periodic collection and combination of individual sample aliquots.

The most common composite sampling methods involve periodic collection and combination of individual sample aliquots. One such method yields a single sample composed of discrete sample aliquots collected in one container at constant time intervals. This method provides representative samples when the flow of the samples stream is constant or when the sample volume is manually adjusted for varying flow prior to being added to the composite sample container. Another method provides for the collection of a constant sample volume at time intervals proportional to stream flow(e.g., 200 ml/g sample collected for every 5,000 gallons of stream flow). This method provides representative samples of all wastestreams when the flow is measured accurately. For this reason, it is used most frequently.

A composite sampling method enables collection of discrete samples at constant time intervals. The volume of these samples is proportional to the total stream flow since the last sample. This method is not widely used because most automatic samplers do not provide for it. A variation of this method is to collect a constant volume of sample in individual sample bottles at equal time intervals. At the end of the sampling period, such as 24 hours, each of the 24 individual samples is manually flow proportioned according to the flow recorded for the hour that the sample represents. Each sample thus flow proportioned is then added to the composite samples. The actual compositing of the samples may be done in the field or the laboratory.

- Identify sample analysis needs - must be clearly defined by the inspector. These will vary depending on the type of sample being collected (e.g., single verses multi-phase samples) and the level of detecting that is needed for compliance/enforcement purposes. In general, a facility will be required to conduct their own waste analyses using procedures consistent with SW-846, or Standard Methods for the Examination of Water and Wastewater. However, the inspector should be aware that these references sometimes include several methods of analysis for a given pollutant, and that different methods will generally have differing levels of detection and accuracy. If enforcement concerns dictate that analyses be conducted by methods that have a low detection level for particular pollutants, the inspector should make appropriate arrangements with the laboratory so that these needs can be accommodated.

- Sample handling concerns - relating to chain-of-custody, and the use of a field log book have been addressed in the first Section 3.3.1.5 above. Sample preservation and sample container information presented in Table 3-3 must be followed to ensure the validity of sampling evidence.

3.3.3.2 Flow Estimates

Under many circumstances RCRA inspectors will be able to rely on flow meters, installed by an owner/operator, to gauge the magnitude of a process or wastewater flow. However, conditions can arise when convenient meters are not available and an estimate of flow needs to be made by the inspector. In this section a variety of methods for estimating flows are described. Some techniques lack sophistication and may provide only an order of magnitude estimate; still other techniques rely on complex calculations and can provide to be quite accurate.

In addition to providing flow estimation methods for open channels and conduits and outfalls, dilution methodologies are also provided which may, in some instances be used for estimating stream flows. The information presented in this section is taken from the NPDES Compliance Flow Measurement Manual, September 1981 (MLD-77).

Basic Methods

Three basic methods for determining flow are discussed below -- (I) weighing the discharge, (II) volumetric methods, and (III) sump pumps. They are all useful but rather primitive. However, they are convenient and fast. Inspectors should weigh the relative advantages and disadvantages of each before making a decision to use one of these methods.

(I) Weighing the Discharge

This procedure is easy and quick. First, a container must be selected in which to collect the discharge. Its size depends on the relative volume of discharge. This method should only be used primarily for small flows in the range of 25 gallons per minute (gpm) or less. Another estimating value to determine if this method should be used is the container should take more than two or three seconds to fill. The longer the container takes to fill, generally the more accurate this method will be. A handy container is a standard plastic or metal bucket.

After the container has been selected, weigh it amply. This weight is called the TARE WEIGHT. After weighing, collect a quantity of water or wastewater while using a stopwatch to time how long the container takes to fill. Then the weight of the full bucket minus the tare weight equals the weight of the fluid. To convert the fluid's weight to gpd, use the factor 8.347 lb/gal water.

Example: If a bucket takes 5.1 seconds to fill, the tare weight is 1.4 lbs., and the total weight is 16 lbs., what is the flow?

$$16 - 1.4 = 14.6 \text{ lbs. water} \times \frac{1}{8.347 \text{ lbs/gal}} = 1.75 \text{ gal}$$

$$\frac{1.75 \text{ gal}}{5.1 \text{ sec}} = 0.343 \text{ gal/sec} \times 60 \text{ sec/min} = 20.6 \text{ gpm}$$

If the volume of the bucket is measured ahead of time, then the weighing process can be eliminated.

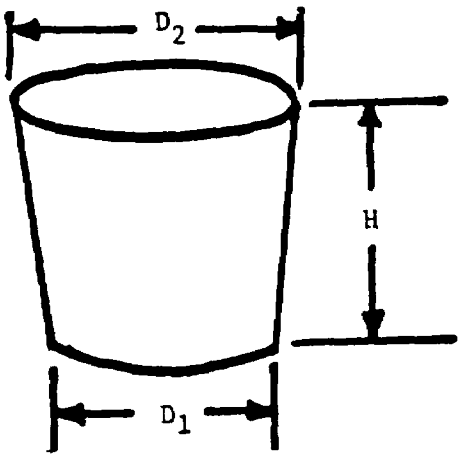
(II) Volumetric Methods

Volumetric flow measurement methods have the advantage of being easy. A volumetric measurement is simply a measurement of the amount of time it takes to fill a container. Different types of containers can be used depending on their availability.

Some of them are listed in Table below with their corresponding volumetric formulas:

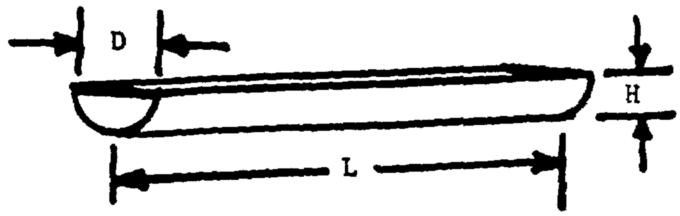
Container Type	Formula
Sphere	$V = 1/16\ \Pi\ D^3$
Right Cylinder	$V = 1/4\ \Pi\ D^2h$
Rectangular Cylinder	$V = HLW$

Container Type	Formula
Triangular Cylinder	$V = 1/2\ HBL$
Elliptical Container	$V = \Pi\ BDH$ (where B is the largest diameter of the ellipse)
Frustrum of Cone	$V = \frac{\Pi}{12} H(D_1^2 + D_1D_2 + D_2^2)$



Cone	$V = (1/12)\ \Pi\ D^2H$

Container Type	Formula
Parabolic Container	V = (2/3) HDL



In the above formulas,

D = diameter
h,H = height
L = length
W = width
B = base

For this method to approach accuracy, the minimum filling time should be about 10 seconds, and the flow should be less than 30 gpm. Fill the container three times while timing it with a stopwatch, and average the results.

Example: It takes 15.2, 15, and 15.8 seconds to fill a bucket with the dimensions, D_1 = 8 in., D_2 = 10 in., H = 11 in. What is the flow?

$$V = \frac{\pi}{12} H(D_1^{\,2} + D_1D_2 + D_2^{\,2}) = \frac{3.1416}{12} (11)\ (8^2 + (8)(10) + 10^2)$$

$$V = 703 \text{ in}^3 \times (1 \text{ ft}^3/1728 \text{ in}^3) = 0.41 \text{ ft}^3$$

$$t = \frac{15.2 + 15 + 15.8}{3} = 15.33 \text{ sec.}$$

$$Q = 0.41\ ft^3/15.33\ sec = 0.027\ cfs \times \frac{0.646\ mgd}{1\ cfs}$$

$$Q = 0.0173\ mgd = 0.017\ mgd\ (\text{or even } 0.02\ mgd)$$

Q is the quantity of water or the flow.

(III) Sump Pumps

Often, inspectors will have to calculate flow based on the discharge or overflow from a sump pump. To calculate the discharge from a sump pump the following equation may be used:

If the flow, Q is directly proportional to the kwh used, then the volume pumped per pump cycle is:

$$V_p = V_s + Q_i t_p$$

where:

V_p = volume pumped/cycle (gal)
V_s = storage volume of the wet well (gal)
Q_i = flow of the influent sewer (gal/sec)
t_p = time pump runs/cycle (sec)

The error introduced is the flow into the sump during the pump cycle.

Weirs

Weirs are a commonly used flow measurement device and are found in many field situations. They are one of the three kinds of devices normally employed to measure open channel flow. Inspectors anticipating the need to measure flow in an open channel may be able to construct a dam across the channel and actually in stall a weir. Safety considerations should be thoroughly evaluated before embarking on such an endeavor.

A sharp-crested weir is a very thin plate, perpendicular to the flow. Most sharp-crested weirs are less than 0.25 inches thick, and many are about 0.10 inches thick. The weir's top edge is often chamfered towards the downstream face. Water or wastewater flows over the weir and the flow is directly proportional to the head or height of water over the weir. A side view of an ideal sharp-crested weir is shown in Figure 3-3. From Figure 3-3, several important conclusions can be drawn:

- There must be a straight run of water to the weir, usually at least 20 times the total height of the weir head (H).
- The point where water springs freely over the weir is called the nappe.
- The height of the weir must be at least 2 times the maximum head.

K in Figure 3-3 is the width of the weir itself. The variable, X, is the height of the weir to the bottom of the notch, and H is the head over the weir. For sharp crested weirs the inspectors should note the following during the inspection:

- Is the weir plate perpendicular, and are the sides of the channel vertical?
- Is the plate thickness about 0.1"? Does it have a 45 chamfer?
- Is $P + H_T > 2H$? Is $P + H_T \geq 1$ ft.?
- Does the nappe touch the upstream side? Does air circulate freely underneath the downstream side?
- Is the channel straight and long upstream from the weir?
- Do the sides and bottom of the weir allow leaks? There should be none.

A more complete discussions of flow estimation using weirs may be found in the NPDES Compliance Flow Measurement Manual - September 1981 (MLD-77).

Orifices

An orifice is an opening with a closed perimeter of regular form through which water or wastewater flows (if it flows only partially full, then it is weir, and the standard weir formulas are used to calculate flow). The discharge equation for an orifice is:

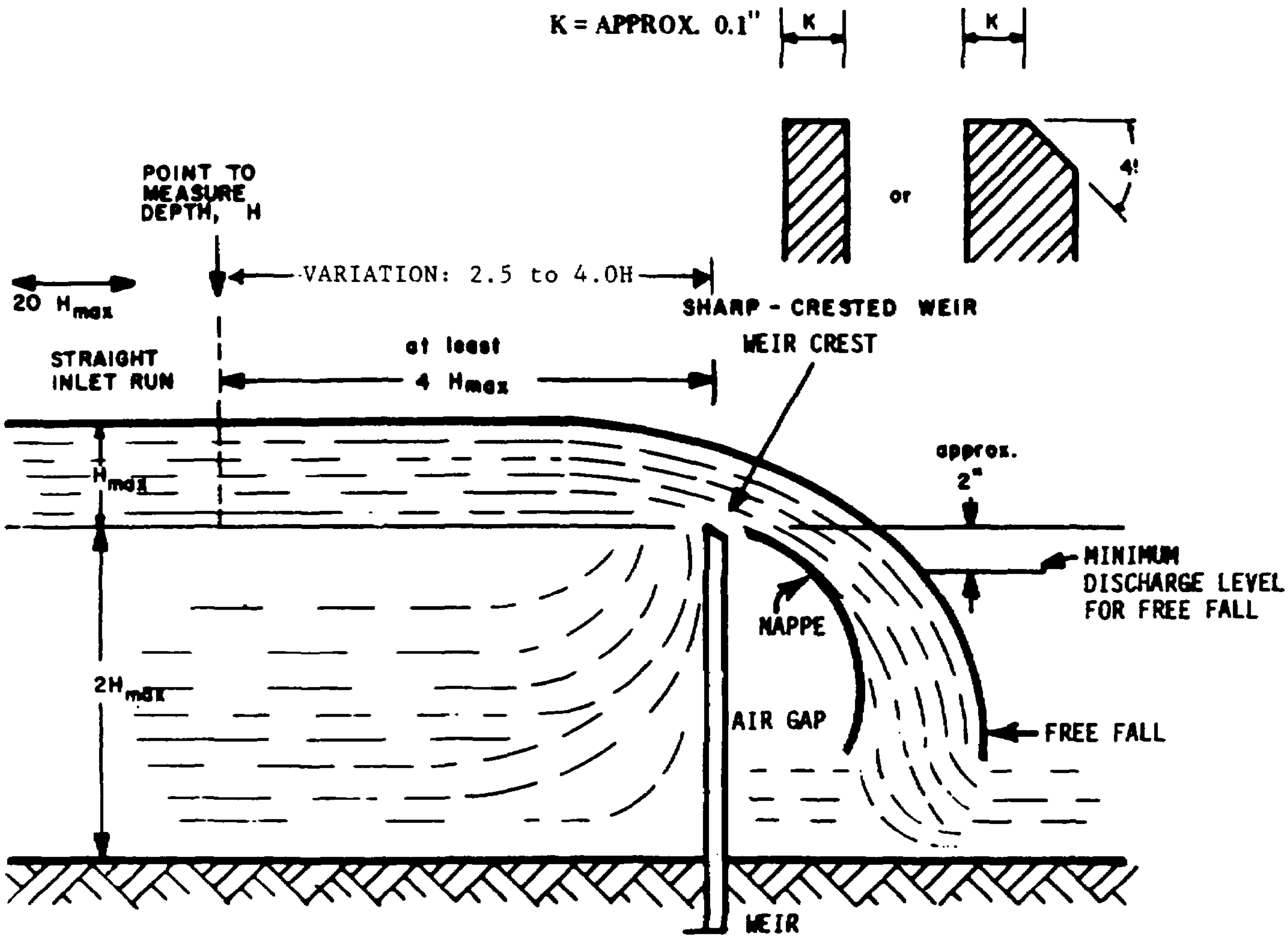


FIGURE 3-3.

Profile and Nomenclature of Sharp-Crested Weirs
(Associated Water and Air Resource Engineers, Inc., 1973)

$$Q = Ca\sqrt{2\,gH}$$

where:

Q = flow (cfs)

C = coefficient of contraction (from figure 3-8)

a = orifice area (ft^2)

g = acceleration of gravity = 32.2 ft/sec^2

H = head (ft)

<u>Example</u>: A 75-mm-diameter orifice type "B" with $\alpha = 112.5^0$ has a head of 4.88 inches. What is the flow?

$$Q = Ca\sqrt{2gH}$$

$$a = \Pi r^2 = 3.1416 \times \left(\frac{75mm}{2} \times \frac{0.03937\ in.}{mm} \times \frac{1\ ft.}{12\ in.}\right)^2$$

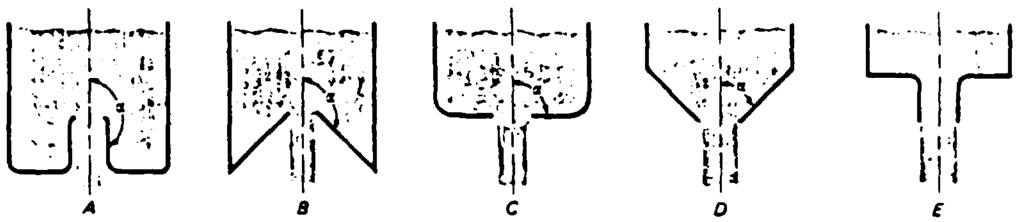
$$= \left[2(32.2)\left(4.88\ in. \times \frac{1\ ft.}{12\ in.}\right)\right]^{1/2}$$

c = 0.606. (From Figure 3-4)
Q = (0.606)(0.387)(26.19)1/2 = 1.20 cfs

<u>Note</u> Convert all values to proper units.

<u>Open-Pipe Methods</u>

If an outfall discharges unsubmerged above a receiving water, an open-pipe method can be used to determine flow. The California Pipe methods is one such method used for horizontal discharging pipes.



	A		B		C	D					E
α	180°	157½°	135°	112½°	90°	67½°	45°	22½°	11¼°	5⅝°	0°
C	0.541	0.546	0.577	0.606	0.632	0.684	0.753	0.882	0.924	0.949	0.966

FIGURE 3-4.

ORIFICE SHAPES AND THEIR COEFFICIENTS

The California Pipe Method

Four basic criteria must be satisfied for the method to be valid:

(1) The pipe must be level.
(2) The pipe must discharge partially full.
(3) The pipe must discharge freely into the air.
(4) The velocity of approach must be practically zero.

The equation is based on experimental data, and it is good for pipe diameters from 3 to 10 inches (0.25 to 0.83 ft.). It cannot be used with corrugated metal pipes.

The formula calculating flow using the California Pipe Method is:

where: $$Q = 8.69 \left(1 - \frac{a}{\phi}\right)^{1.88} \left(\phi\right)^{2.48}$$

Q = discharge, cfs

a = distance from the inside crown (top) of the pipe to the water surface measured at the point at which the wastewater discharges from the pipe, ft.

ϕ = diameter of the pipe, ft.

This is illustrated in by (Figure 3-5).

Dilution Methods and Tracers

Dilution methods for water and wastewater flow are based on the color, conductivity, or fluorescence of a tracer injected into the waste stream.

There are two methods: a slug-dose can be injected, or the tracer can be injected continuously. There are merits to each method. Tracers used include sodium chloride (NaCl)--sometimes called the salt-velocity method or the salt dilution method slug addition-- and lithium chloride (LiCl). Fluorescent dyes, like rhodamine B and Pontacyl Brilliant Pine B, have been extensively

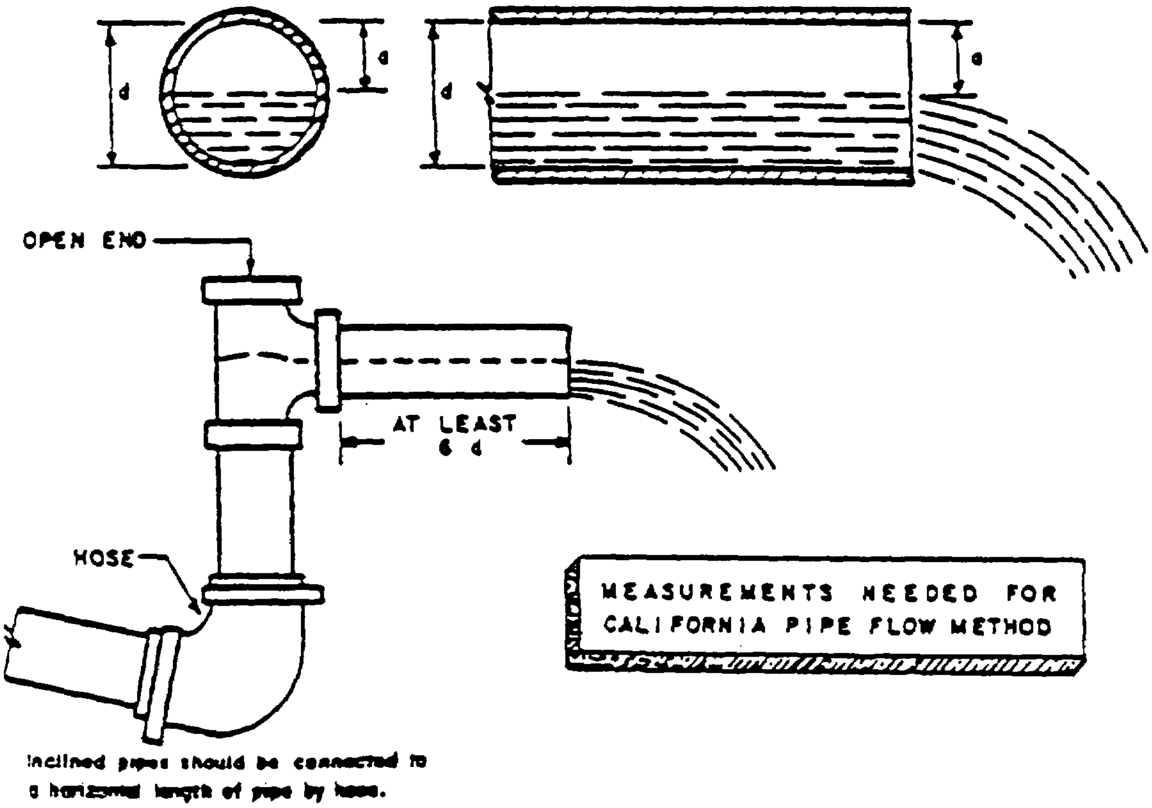


FIGURE 3-5.

CALIFORNIA PIPE FLOW METHOD

used in ocean outfall studies. Submersible pumps with flow-through fluorometers and recorders can also be employed to measure flow by this method.

Slug vs. Constant-Rate Injection

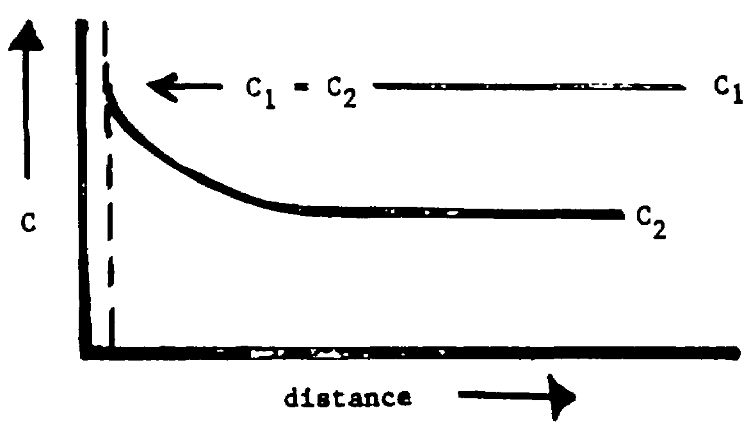
A comparison of the mathematical expressions used to calculate flow and the concentration-time curves for each of the above methods is presented as Figure 3-6.

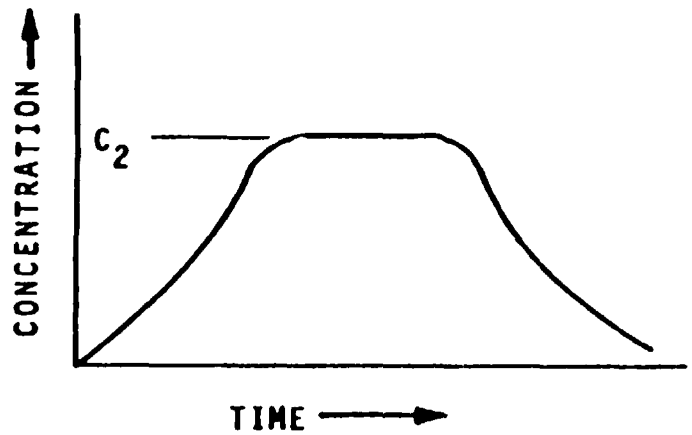
For continuous injection, if q, the constant flow rate of the injected tracer, is much smaller than the flow, and if the optimum concentration (of the plateau) is much greater than the background concentration, then the equation can be simplified to:

$$Q = q \frac{c_1}{C_2}$$

But:

- q is a constant injected by perhaps a piston chemical metering pump:
- The tracer must be degrade or sorb onto other particles, and
- The dye must be well-mixed across the section so the following relationship results;





a. CONCENTRATION-TIME CURVE FOR CONSTANT-RATE INJECTION METHOD.

$$Q = \left(\frac{C_1 - C_2}{C_2 - C_0}\right) q$$

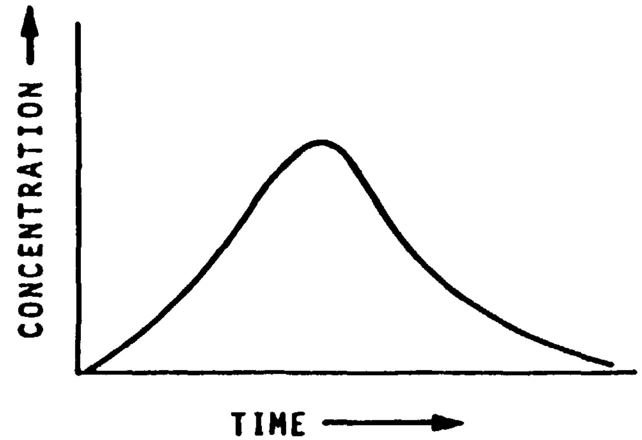
Q = IS FLOW RATE OF STREAM

q = IS FLOW RATE OF CHEMICAL

C_0 = IS BACKGROUND CONCENTRATION OF STREAM

C_1 = IS CONCENTRATION OF CHEMICAL INJECTED

C_2 = IS CONCENTRATION OF STREAM PLATEAU



b. CONCENTRATION-TIME CURVE FOR SLUG-INJECTION METHOD.

$$Q = \frac{v\ C_1}{\int_0^\infty (C_2 - C_0)\,dt}$$

Q = IS FLOW RATE OF STREAM

v = IS VOLUME OF CHEMICAL INJECTED

C_0 = IS BACKGROUND CONCENTRATION OF STREAM

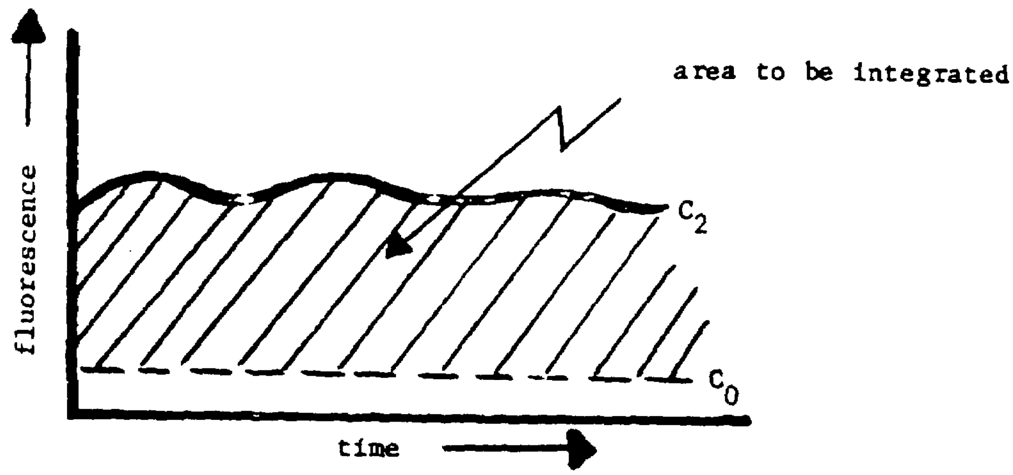
C_1 = IS CONCENTRATION OF CHEMICAL INJECTED

C_2 = IS INSTANTANEOUS STREAM CONCENTRATION

FIGURE 3-6.

CONSTANT RATE AND SLUG INJECTION METHODS

For slug injection, the bottom value $(C_2 - C_o)dt$ can be determined graphically by plotting fluorescence over time and integrating between C_o and C_2 manually with a planimeter:



The advantages of slug injection is sophisticated equipment is not needed for injection. The advantages of slug injection are:

- It is only good in steady flows,
- The entire pulse must be sampled.

The error rate of either of these methods is $\pm$ 3%.

3.3.3.3 Selection And Preparation Of Sample Containers

The most important factors to consider when choosing containers for hazardous waste samples are compatibility, resistance to breakage, and volume. Sample containers must be made of chemically resistant material that does not affect the concentration of pollutants to be measures. Thus, it is important to have some idea of the components of the waste. Sample containers generally used for hazardous materials samples is either glass or plastic. The selection of the sample container is based on whether the container material will affect pollutant concentrations in the sample. If either type of sample container is acceptable, the inspector should use plastic ones because they are less likely to break. Acceptable containers for different types of samples are shown in Table 3-3.

Containers must be large enough to contain the required volume for laboratory analysis. The volume of sample obtained must be sufficient for all the analyses to be made and for any repeat analyses used for verification. The minimum grab sample volume is one to two liters. Individual composite portions should be 25 to 100 milliliters (ml), with a total composite volume of 2-4 liters. Large volumes may be necessary if samples are to be split.

Container lids and closure linings must also be inert so that they do not interfere with the pollutant parameters to be measured. Containers must have tight, screw-type lids. Plastic containers are usually provided with screw caps made of the same material as the container, so that cap liners are usually not required. Glass containers usually come with glass or rigid plastic screw caps. Liner materials may be polyethylene, polypropylene, neoprene, and teflon. Hazardous waste samples containing petroleum distillates, chlorinated hydrocarbons, and pesticides should use bakelite caps with teflon liners.

Cleaning and Storage of Sampler

All samplers must be clean and uncontaminated before use. In most cases, sample container cleaning procedures are the same, however, some pollutants require special cleaning procedures. Standard Methods for the Examination of Water and Wastewater should be referred. Used samplers must be washed with warm detergent solution (i.e., Liquinox or Alconox), rinsed several times with tap water, rinsed with distilled water, drained of excess water, and air dried or dried with a stream of warm, dry air or wiped dry. For samplers that have been used to sample petroleum products and oil residues, it may be necessary first to wipe the samplers with absorbent cloth to eliminate the residues. The equipment is then rinsed with an organic solvent such as petroleum naphtha or trichloroethane, followed by washing with the detergent solution and rising with water.

Improper cleaning of sampling equipment will cause cross contamination of samples. Such contamination is of particular importance in samples taken for legal or regulatory purposes. Also, contamination becomes important when sampling wastes from different production sources within the same time frame.

Parts of a sampling device that become contaminated during sampling (i.e., the tube, the stopper rod, and the stopper mechanism) may be discarded at little expense. In addition, these parts may later be disassembled, secured, and returned to the laboratory for thorough decontamination and reused.

If the cleaning process has the potential for producing toxic fumes, ensure adequate ventilation. If the washings are hazardous, store them in closed waste containers and dispose of them properly in approved disposal sites. Locations of these sites close to one's area may be obtained by calling the agency in the State responsible for the regulation of hazardous wastes. Store the clean sampler in a clean and protected area. Polyethylene plastic tubes or bags are usually adequate for storing the samplers.

3.3.3.4 Sampling Equipment

Manual Sampling Equipment

Plastic sample bottles (polyethylene, polyvinyl chloride, teflon) - These bottles are commercially available in a wide range of volumes, are inexpensive (compared to glass bottles) and, unlike glass, are unbreakable. The bottles should have a wide mouth with an opening of at least 2 inches in order to obtain the sample as rapidly as possible.

Glass sample bottles - Bacteriological samples should be collected in sterilized wide mouth bottles equipped with ground glass stoppers. The bottles should not be completely filled to enable mixing of sample by shaking prior to analysis. Only the lower part of the bottle should be held by the hand and the stopper protected from contamination.

Volatile organic substances should be collected in 40 ml glass sample vials sealed with a teflon-coated septum seal. There must be no air bubbles in the container after the screw cap and septum seal are applied. A large wide-mouth glass bottle should be used to grab the sample from the wastestream then transferred to the 40 ml vial. The sample must be poured very slowly into the vial to minimize aeration.

Amber glass bottles are used to collect samples for analysis of photosensitive parameters such as cyanide, base/neutral organic substances, acids and pesticides.

Depth samplers - Special sampling equipment may be necessary to obtain samples at different depths in a wastestream or tank. Commercial devices are available; one such device (Sirco Uniscoop Liquid Sampler) is a simple, manually-operated device in which the sampler is lowered into the wastestream to a desired depth, then by pulling on a handle, a ball-plug opens which admits wastewater into the container. Another simple device is a weighted bottle with a cork top. The weighted bottle attached to a line is lowered to the desired depth and another line connected to the cork is pulled allowing the wastewater to enter the bottle.

For stratified waste solutions, a graduated glass or plastic cylinder open at both ends can be lowered into the solution to obtain a cross-section of the sample. The cylinder is corked at both ends by a level arrangement.

Automatic Sampling Equipment

There is a wide range of portable automatic samplers commercially available. Selection of a specific type of automatic sampler should consider the site and wastewater characteristics; however, one versatile sampler could adapt to any situation. A versatile sampler should include: capability for flow-proportional and time-composite samples, adjustable sample collection interval from 10 minutes to 4 hours, adjustable intake hose liquid velocity from 0.61 to 3 meters per second (2.0 to 10 feet per second) with dial setting, minimum lift of 6.1 meters (20 feet), capability of operating in a temperature range from -30 to 50°C, purge cycle before and after each collection interval and sensing mechanism to purge in event of plugging during sample collection and then to collect complete sample, capability for collecting a single 9.5 liter (2.5 gallon) sample and/or collecting 400 milliliter (0.11 gallon) discrete samples in minimum of 24 containers, interchangeable between glass and plastic bottles, capability for multiplexing repeated aliquots into discreet bottles, an integral sample container compartment capable of maintaining samples at 4 to 6° for a period of 24 hours at ambient temperatures ranging from -30 to 50°C.

Major factors to consider in selecting portable automatic sampling equipment are: 1) convenience of installation and maintenance; 2) equipment security; and 3) cold weather operation.

Criteria that would enhance ease of installation and maintenance include: capability for AC/DC operation with adequate dry battery energy storage for 120-hour operation at 1-hour sampling intervals, compact with total weight, including batteries, under 18 kilograms (40 pounds), explosion-proof, watertight exterior case, field repairability, sealed solid state controls to protect against high humidity and corrosiveness.

Equipment security is especially important when the sampling is done as part of an enforcement proceeding. The exterior case should be capable of being locked, and have lugs for attaching a steel cable to prevent tampering. If sampling equipment must be left unattended, the sampler should be provided with a lock or seal which, if broken or disturbed, would indicate that tampering had occurred.

Problems with freezing in cold weather can be eliminated by using heat tape or placing the sampler inside a thermostatically controlled, electrically heated enclosure or wrapping the sample with eight or nine inches of insulation.

Manufacturer's instructions on use, calibration and maintenance should be followed.

3.3.4 Air Surveillance

3.3.4.1 Introduction

RCRA rules and regulations were written so as to reduce the threat to human health and the environment posed by the disposal of wastes. The principal threat was assumed to be the contamination of surface and groundwater. The exposure to toxic material by airborne mechanisms was recognized, and with the exception of incineration, few specific rules* were established. Air surveillance is generally conducted to:

- Investigate of potential emission sources
- Respond to accident releases of hazardous substances
- Inspect facility for compliance purposes
- Respond to citizen complaints
- Perform incinerator testing.

Typical sources of emissions at RCRA sites are process vents, stacks, leaking pumps, valves and pipes, surface impoundments, landfills, landfarms, and waste handling and transfer operations. Releases can also come from unpredictable events such as chemical fires, transportation accidents, open or leaking containers, wind-blown dust, and site remediation activities. Any of the mentioned sources can produce emissions which can affect the health and safety of the public.

Airborne hazards can be predicted if the substance(s) involved, its chemical/physical properties, and weather conditions are known. But air surveillance is necessary to detect unknown air pollutants, to identify or measure contaminants, or to confirm predictions.

It is imperative that direct-reading instruments (DRI) be operated, and their data interpreted, by qualified individuals who are thoroughly familiar with the particular device's operating principles and limitations and who have

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*40 CFR Sections 264, 317, 267.10(c), 265.17(b)(2) 265.56(c).

obtained the device's latest operating instructions and calibration curves. At treatment, storage, and disposal facilities where unknown and multiple contaminants are the rule rather than the exception, instrument readings should be interpreted conservatively. The following guidelines may facilitate accurate recording and interpretation:

- Calibrate instruments according to the manufacturer's instructions and recommended frequency.
- Develop chemical response curves if these are not provided by the instrument manufacturer.
- Remember that the instrument's readings have limited value where contaminants are unknown. When recording readings of unknown contaminants, report them as "needle deflection" or positive instrument response" rather than specific concentrations (i.e., ppm). Conduct additional monitoring at any location where a positive response occurs.
- A reading of zero should be reported as "no instrument response" rather than "clean" because quantities of chemicals may be present that are not detectable by the instrument.
- The survey should be repeated with several detection systems to maximize the number of chemicals.

Four general scenarios are encountered where air surveillance is appropriate:

- <u>Emissions identification and estimation</u> - Identification of major and minor sources of air pollution can be obtained quickly and easily using a DRI (e.g., OVA, TIP, HNU). The response of these instruments is generally rapid enough that locating leaks in equipment seals, gaskets, and flanges is a simple matter. A walk around the site with an appropriate DRI may provide sufficient information on emission sources so that a more detailed sampling/monitoring strategy can be conceived. The inspector should be aware that the distance from a source greatly affects the concentration. Holding a DRI, such as an OVA, near the surface of a surface impoundment will register many times that recorded at waist height. Thus in order to get a reliable estimate of the relative differences the inspector should determine a distance from sources to be used that is both convenient and safe. Following a pipe rack at ground level, a 4" distance may be best while following an overhead pipe rack 1-2 feet may be a more appropriate distance. Using portable analytical instruments, such as a GC, specific pollutants may be identified.

- Compliance inspections - Air surveillance can also be used as a way of locating sources of leaks. Underground pipes or covered landfills will generally emit a relatively constant concentration of organics, but where the pipe is leaking or where the landfills cap or liner is deficient, a sudden increase in concentration would be expected. Leaks from storage and treatment tanks and piping can also be located using DRIs. Air strippers or other processes using control equipment to reduce organic content of the exhaust gas can be checked to determine if the adsorbent has had breakthrough (for adsorbent medias) and to check on efficiency of the control equipment.

- Environmental releases - including chemical fires, spills, or other releases of hazardous materials which occur over a relatively short period of time. Since contaminants may be released rapidly, there may not be time for air surveillance. In incidents where the released material can be quickly identified (and/or sufficient time is available), direct-reading, hand-held monitoring instruments can be used to provide information on some types of hazards. Air sampling generally is limited unless the release continues long enough for appropriate equipment to be brought in.

- Longer-term cleanup - including remedial action. During this period workers and the public may be exposed to a wide variety of airborne materials over a much longer period of time. Since cleanup activities require more time (and planning) to accomplish, appropriate equipment for air monitoring and sampling can be secure, and an air surveillance program established.

The data obtained are used to document potential exposures, determine protective measures for the public, determine mitigation activities and to help establish criteria for worker health and safety, to evaluate the environmental impact. To accomplish this requires establishing an effective air surveillance program, tailored to meet the conditions at the site.

Objective of Air Surveillance

Air surveillance consists of air monitoring (using direct-reading instruments capable of providing real-time indications of air contaminants) and air sampling (collecting air on an appropriate media or in a suitable container followed by analysis).

The objective of air surveillance is usually to determine the type (chemical compound and associated hazards) and quantity of airborne contaminants on-site and off-site. However, it can also be used as a means of detecting releases of material into the soil or groundwater.

As part of initial evaluation, inspectors may use direct-reading instruments (DRIs), visible indicators (signs, labels, placards, type of container, etc.), and other information (manifests, inventories, Agency records, etc.) to evaluate the presence or potential for air contaminant release. Limited air sampling may also be conducted if time is available. Based on an assessment of this preliminary information, a more comprehensive air surveillance strategy can be developed and implemented.

Direct-reading instruments may be used to rapidly detect flammable or explosive atmospheres, oxygen deficiency, certain gases and vapors, and ionizing radiation. They are the primary tools of initial site characterization. The information provided by direct-reading instruments can be used to institute appropriate protective measures (e.g., personal protective equipment, evacuation), to determine the most appropriate equipment for further monitoring, and to develop optimum sampling and analytical protocols.

All direct-reading instruments have inherent limitations:

- They usually detect and/or measure only specific classes of chemicals
- Generally, they are not designed to measure and/or detect airborne concentrations below 1 ppm
- Many of the direct-reading instruments that have been designed to detect one particular substance also detect other substances (interference) and, consequently, may give false readings.

3.3.4.2 Air Monitoring

The materials presented in this section were taken from a USDHHS (NIOSH) publication entitled Occupational Supply and Health Guidance Manual for Hazardous Waste Site Activity, 1985 Publ. No. 85-115.

As a first step, inspectors should conduct air monitoring to identify any dangerous conditions, such as flammable or explosive atmospheres, oxygen-deficient environments, and highly toxic levels of airborne contaminants. Direct-reading monitoring instruments will normally include combustible gas indicators, oxygen meters, colorimetric indicator tubes, and organic vapor monitors. These instruments are described in Table 3-6. Other monitoring

TABLE 3-6. DIRECT READING INSTRUMENTS

INSTRUMENT	HAZARD MONITORED	APPLICATION	DETECTION METHOD	LIMITATIONS	EASE OF OPERATION	GENERAL CARE AND MAINTENANCE	TYPICAL OPERATING TIMES
Flame Ionization Detector (FID) with Gas Chromatography Option	Many organic gases and vapors.	In survey mode, detects the total concentrations of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated.	Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present.	Does not detect inorganic gases and vapors, or some synthetics. Sensitivity depends on the compound. Should not be used at temperatures less than 40°F (4°C). Difficult to absolutely identify compounds. High concentrations of contaminants or oxygen-deficient atmospheres require system modification. In survey mode, readings can be only reported relative to the calibration standard used.	Requires experience to interpret data correctly, especially in the GC mode. Specific identification requires calibration with the specific analyte of interest.	Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks.	8 hours; 3 hours with strip chart recorder.
Ultraviolet (UV) Photoionization Detector (PID)	Many organic and some inorganic gases and vapors.	Detects total concentrations of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is used.	Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions.	Does not detect methane. Does not detect a compound if the probe used has a lower energy level than the compound's ionization potential. Response may change when gases are mixed. Other voltage sources may interfere with measurements. Readings can only be reported relative to the calibration standard used. Response is affected by high humidity.	Effective use requires that the operator understand the operating principles and procedures, and be competent in calibrating, reading, and interpreting the instrument.	Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories.	10 hours; 5 hours with strip chart recorder.
Portable Infrared (IR) Spectrophotometer	Many gases and vapors.	Measures concentration of many gases and vapors in air. Designed to quantify one- or two-component mixtures.	Passes different frequencies of IR through the sample. The frequencies adsorbed are specific for each compound.	In the field, must make repeated passes to achieve reliable results. Requires 115-volt AC power. Not approved for use in a potentially flammable or explosive atmosphere. Interference by water vapor and carbon dioxide. Certain vapors and high moisture may attack the instrument's optics, which must then be	Requires personnel with extensive experience in IR spectrophotometry.	As specified by manufacturer.	

TABLE 3-6. DIRECT READING INSTRUMENTS (Continued)

INSTRUMENT	HAZARD MONITORED	APPLICATION	DETECTION METHOD	LIMITATIONS	EASE OF OPERATION	GENERAL CARE AND MAINTENANCE	TYPICAL OPERATING TIMES
Direct-Reading Colorimetric Indicator Tube	Specific gases and vapors.	Measures concentrations of specific gases and vapors.	The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration.	The measured concentration of the same compound may vary among different manufacturers' tubes. Many similar chemicals interfere. Greatest sources of error are (1) how the operator judges stain's end-point, and (2) the tube's limited accuracy. Affected by high humidity.	Minimal operator training and expertise required.	Do *not* use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate prior to use to maintain shelf life of about 2 years. Check expiration date of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.	
Oxygen Meter	Oxygen (O_2).	Measures the percentage of O_2 in air.	Uses an electrochemical sensor to measure the partial pressure of O_2 in the air and converts that reading to O_2 concentration.	Must be calibrated prior to use to compensate for altitude and barometric pressure. Certain gases, especially oxidants such as ozone, can affect readings. Carbon dioxide (CO_2) poisons the detector cell.	Effective use requires that the operator understand the operating principles and procedures.	Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to expiration of the specified interval. If the ambient air is more than 0.5% CO_2, replace or rejuvenate the O_2 detector cell frequently.	8 to 12 hours.
Combustible Gas Indicator (CGI)	Combustible gases and vapors.	Measures the concentration of a combustible gas or vapor.	A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured.	Accuracy depends, in part, on the difference between the calibration and sampling temperatures. Sensitivity is a function of the differences in the chemical and physical properties between the calibration gas and the gas being sampled. The filament can be damaged by certain compounds such as silicones, halides, tetraethyl lead, and oxygen-enriched atmospheres. Does not provide a valid reading under oxygen-deficient conditions.	Effective use requires that operator understand the operating principles and procedures.	Recharge or replace battery. Calibrate immediately before use.	Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

instruments may be necessary based on the initial site characterization. When time permits, air samples should be collected for laboratory analysis. Extreme caution should be exercised in continuing a site survey when atmospheric hazards are indicated. Monitoring personnel should be aware that conditions can suddenly change from nonhazardous to hazardous.

Acutely hazardous concentrations of chemicals may persist in confined and low-lying spaces for long periods of time. Look for any natural or artificial barriers, such as hills, tall buildings, or tanks, behind which air might be still, allowing concentrations to build up. Examine any confined spaces such as cargo holds, mine shafts, silos, storage tanks, box cars, buildings, bulk tanks, and sumps where chemical exposures capable of causing acute health effects are likely to accumulate. Low-lying areas, such as hollows and trenches, are also suspect. Monitor these spaces for Immediately Dangerous to Life and Health (IDLH) level defined by NIOSH as the maximum contamination that a worker could escape impairing symptoms or irreversible health effects in a 30 minute exposure. Also consider whether the suspected contaminants are lighter or heavier than air. Then, based on the type of contaminants present, consider sampling on hilltops, under any cover or canopy where workers might work or congregate, and in trenches and low-lying areas.

In open spaces, toxic materials tend to be emitted into the atmosphere, transported away from the source, and dispersed. Thus acutely hazardous conditions are not likely to persist in open spaces for extended periods of time unless there is a very large (and hence, readily identifiable) source, such as an overturned tank car. Open spaces are therefore generally given a lower monitoring priority.

Air sampling should be conducted using a variety of media to identify the major classes of airborne contaminants and their concentrations. The following sampling pattern can be used as a guideline. First, after visually identifying the sources of possible generation, collect air samples downwind from the designated source along the axis of the wind direction. Work upwind, until reaching or getting as close as possible to the source. Level B protection should be worn during this initial sampling. Levels of protection for subsequent sampling should be based upon the results obtained and the potential for an unexpected release of chemicals.

After reaching the source, or finding the highest concentration, sample cross-axis of the wind direction to determine the degree of dispersion. Smoke plumes, or plumes of instrument-detectable airborne substances, may be released as an aid in this assessment. To ensure that there is no background interference and that the detected substance(s) are originating at the identified source, also collect air samples upwind of the source.

Perimeter Monitoring

Fixed-location monitoring at the "fenceline" or perimeter, measures contaminant migration away from the site. Because the fixed-location samples may reflect exposures whether upwind or downwind from the site, wind speed and direction data are needed to interpret the sample results.

Periodic Monitoring

Site conditions and thus atmospheric chemical conditions may change following the initial characterization. For this reason, monitoring should be repeated periodically, especially when:

- Work begins on a different portion of the site
- Different contaminants are being handled
- A markedly different type of operation is initiated (e.g., barrel opening as opposed to exploratory well drilling)
- Workers are handling leaking drums or working in areas with obvious liquid contamination (e.g., a spill or lagoon).

3.3.4.3 Air Sampling

For more complete information about air contaminants, measurements obtained with DRIs must be supplemented by collecting and analyzing air samples. To assess air contaminants more thoroughly, air sampling devices equipped with appropriate collection media are placed at various locations throughout the area. These samples provide air quality information for the period of time they operate, and can indicate contaminant types and concentrations over the lifetime of site operations. As data are obtained (from the analysis of samples, DRIs, knowledge about materials involved, site operations, and potential for airborne toxic hazards), adjustments are made in the type of samples, number of samples collected, frequency of sampling, and analysis required. In addition to air samplers, area sampling stations may also include DRIs equipped with recorders and operated as continuous air monitors. Area sampling stations are located in various places including:

- Upwind - Samples must be taken upwind of the site to establish background levels of air contaminants.
- Support zone - Samples must be taken near the command post or other support facilities to ensure that they are in fact located in a "clean" area, and that the area remains "clean" throughout operations at the site.
- Contamination reduction zone - Air samples should be collected along the decontamination line to ensure that decontamination workers are properly protected and that on-site workers are not removing their protective gear in a contaminated area.
- Exclusion zone - The exclusion zone presents the greatest risk of exposure to chemicals and requires the most air sampling. Sampling stations should be located based upon hot-spots detected by DRIs, types of substance(s) present, and potential for airborne contaminants. The data from these stations, in conjunction with intermittent walk-around surveys with DRIs, are used to verify the selection of proper levels of worker protection and exclusion zone boundaries, as well as to provide to continual record of air contaminants.
- Downwind - A sampling station(s) is located downwind from the site to indicate if any air contaminants are leaving the site. If there are indications of airborne hazards in populated areas, additional samplers should be placed downwind.

From an enforcement perspective only the upwind and downwind sites are important since the public is off-site. The other sites are important for the protection of worker/visitor health and safety and establishing appropriate safety practices.

Complex, multisubstance environments such as those associated with hazardous waste sites pose significant challenges to accurately and safely assessing airborne contaminants. Several independent and uncontrollable variables, most notably temperature and weather conditions, can affect airborne concentrations. These factors must be considered when developing an air monitoring program and when analyzing data. Some demonstrated variables include:

- Temperature - An increase in temperature increases the vapor pressure of most chemicals.
- Wind Speed - An increase in wind speed can affect vapor concentrations near a free-standing liquid surface. Dusts and particulate-bound contaminants are also affected.
- Rainfall - Water from rainfall can essentially cap or plug vapor emission routes from open or closed containers, saturated soil, or lagoons, thereby reducing airborne emissions of certain substances.
- Moisture - Dusts, including finely-divided hazardous solids, are highly sensitive to moisture content. This moisture content can vary significantly with respect to location and time and can also affect the accuracy of many sampling results.
- Vapor emissions - The physical displacement of saturated vapors can produce short-term, relatively high vapor concentrations. Continuing evaporation and/or diffusion may produce long-term low vapor concentrations and may involve large areas.
- Work activities - Work activities often require the mechanical disturbance of contaminated materials, which may change the concentration and composition of airborne contaminants.

Meteorological Considerations

Meteorological information is an integral part of an air surveillance program. Data concerning wind speed and direction, temperature, pressure, and humidity, singularly or in combination, are needed for:

- Selecting air sampling locations
- Calculating air dispersion
- Calibrating instruments
- Determining population or environmental exposure from airborne contaminants.

Knowledge about wind speed and direction is necessary to effectively place air samplers. In source sampling particularly, samplers need to be located downwind (at different distances) of the source and others placed to collect background samples. When necessary, samplers must be relocated to take account of changes in wind direction. In addition, models for predicting contaminant dispersion and concentration need wind speed and direction as inputs for predictive calculations. Information may be needed concerning the frequency winds blow from certain directions (windrose data), consequently, the wind direction must be continually monitored.

Air sampling systems need to be calibrated before use and corrected for temperature and pressure. After sampling, sampled air volumes are also corrected for temperature, humidity, and pressure variations.

Air sampling is sometimes designed to assess population exposure (and frequently potential worker exposure). Air samplers are generally located in population centers irrespective of wind direction. Even in these instances, however, meteorological data is needed for air dispersion modeling. Models are then used to predict, verify, or refute the non-source sampling results.

Proper data is collected by having meteorological stations on-site or obtaining it from one or more of several government or private organizations which routinely collect such data. The choice of how information is obtained depends on the availability of reliable data at the location desired, resources needed to obtain meteorological equipment, accuracy of information needed, and use of information.

Local airports and some radio and television stations routinely collect this information. If such facilities are nearby their data can be used. Another potential sources may be determined from the local air pollution control agency as some facilities are required to gather meteorological data or the agency may gather it itself. An air monitoring plan should discuss the existence and suitability of meteorological data obtainable from other sources. If no suitable sources can be found then the agency may conduct meteorological monitoring or require the facility to collect weather data.

Field Instruments

The most accurate method for evaluating any air contaminant usually is to collect samples and analyze them at a reliable laboratory. Although accurate, this method has three disadvantages: cost and the time required to obtain results, sample collection, and integrity. Analyzing large numbers of samples in laboratories is very expensive, especially if results are wanted quickly. On-site laboratories tend to reduce the turn-around time, but unless they can analyze other types of samples, they also are costly. In emergencies, time is often not available for laboratory analysis of samples either on-site or off-site. Some chemicals cannot be effectively collected and others are reactive or unstable and break down before analysis can be done.

To obtain air monitoring data rapidly at the site, instruments utilizing flame ionization detectors (FIDs) and photoionization detectors (PIDs) can be used. These may be used as survey instruments (total concentration mode) or operated as gas chromatographs (gas chromatograph mode). As gas chromatographs, these instruments can provide real-time, qualitative/quantitative data when calibrated with standards of known air contaminants. Combined with selective laboratory analysis of samples, they provide a tool for evaluating airborne organic hazards on a real-time basis, at a lower cost than analyzing all samples in a laboratory.

The instruments and methods described below are most appropriate for surveys and checks in the field. Equipment to be used for testing process operations should be selected from one of the methods listed in Appendix A of 40 CFR Part 60, EPA's regulations on performance standards for new stationary sources. These methods are generally more intensive in terms of time, manpower, and equipment but they have the advantage of being approved methods and their results are preferred for enforcement actions.

The instruments shown here indicate or determine concentrations of substances. They do not provide information on that rate of release of the compounds. Other methods or modeling would be necessary to determine emission rates.

3.3.4.4 Equipment Selection

The choice of equipment for air surveillance depends on the type of danger posed by the material (e.g., toxicity, flammability), the state of the material (e.g., gas, solid), and other physical and chemical characteristics.

Hazards monitored for as a part of enforcement and compliance purposes may include any of the following:

- Acutely toxic gases and vapors
- Bioaccumulative or carcinogenic gases, vapors, and particulates
- Explosive atmospheres
- Irritating or noxious gases and vapors.

Another hazard from the standpoint of safety is:

- Oxygen-deficient atmospheres ($< 19.5\% \ O_2$).

The equipment selected by the inspector must be applicable to the physical state of the pollutants of concern. For example, instruments may not respond to particulates so other equipment may be needed to handle particulates. also, equipment may become contaminated by substances present. So the inspector should make an effort to determine the nature of the hazard being investigated and the limitations of the equipment used.

Two important limitations in monitoring equipment are portability and accuracy. Portability is important when attempting to define contaminated areas, particularly if winds shift direction and speed often. The detection level and precision of the equipment may be crucial if the results are to be used in an enforcement action. Calibration records, field blanks, strip charts of readings, and other documents QA/QC procedures help to establish the validity of readings taken. Without this backup information results can be easily challenged.

A brief description of equipment for collecting air surveillance information follows.

Determining Oxygen Content in Ambient and Workplace Environments with a Portable Oxygen Monitor (e.g., Safety Considerations)

- Applicability - Portable oxygen monitors are invaluable when initially investigating the waste site. They are useful in screening in the land, unventilated rooms, empty storage tanks, or other areas that may not contain enough oxygen to support life. When used properly, the portable oxygen monitor will indicate the percent oxygen in the test atmosphere. Normal oxygen concentrations required for human respiration is 20.9 percent.

Determination of Combustible Gas Levels Using a Portable Combustible Gas Indicator

- Applicability - In general, combustible gas detectors are used to determine the potential for combustion or explosion of unknown atmospheres. These instruments, in combination with oxygen detectors and radiation survey instrumentation, should be the first monitors used when entering a hazardous waste area. In this sense they provide a general indication of the degree of immediate hazard to personnel and can be used to assist the safety officer in making decisions on levels of protection required at the site. However, they provide little or no information about the presence of compounds hazardous or toxic at trace level concentrations. May also be used to monitor for methane gas concentrations.

Monitoring Organic Vapors Using a Portable Flame Ionization Detector (FID)

- Applicability - A portable FID is useful as a general screening tool to detect the presence of most organic vapors. It will not, however, respond to particulate hydrocarbons such as pesticides, PNA's and PCBs. It can be used to detect pockets of gaseous hydrocarbons in depressions of confined spaces, to screen drums or other containers for the presence of entrapped vapors, or generally to assess an area for the presence of elevated levels of vapor phase organics.

Monitoring Toxic Gases and Vapors Using a Photoionization Detector

- Applicability - The portable photoionization detector is useful as a general instrument at RCRA sites. As such, it is similar to an FID in application; however, its capabilities are somewhat broader in that it can detect certain inorganic vapors. Conversely, the PID is unable to respond to certain low molecular weight hydrocarbons (e.g., methane and ethane) that are readily detected by FID. In addition, certain toxic gases and vapors (e.g., carbon tetrachloride and HCN) have high ionization potentials and cannot be detected with a PID. High energy lamps are very sensitive to high humidity though and the presence or lack of water vapor will alter the response characteristics.

Use of Portable, Field-Operable Gas Chromatographs

- Applicability - In theory, any compound which can pass through a gas chromatographic column as discreet, "peak" and is capable of being detected by the detector is amenable to this method. In practice, this may not always be the case. Types of field-operable GC's include Century Systems Model OVA-138 Organic Vapor Analyzer (OVA), Model 10A10 Photovac, HNu Model 301 Gas Chromatograph, and Sentex Sensing Technology Scentor Automated Gas Chromatograph. Some of the factors which could be considered before using a portable GC in a field environment include column selection and compound volatility.

Stain Detector Tube Method for Sampling Gaseous Compounds

- Applicability - Stain detector tubes are useful for screening sources to verify the presence of suspected compounds and to provide some degree of quantification. The limiting factors in the application of this methodology are the small number of compounds for which detector tubes are available, interfering agents and cross-sensitivities, short sampling time, and the extremely small sample volume used. They are more useful for detection of compounds at high levels such as in drums, confined work areas, pockets or depressions, etc.

Sampling for Volatile Organics in Ambient Air Using Solid Sorbents

- Description - The sample apparatus consists of a sampling cartridge packed with a solid sorbent of desirable characteristics (e.g., Tenax-GC, activated charcoal, XAD-2) and a pump system capable of maintaining a constant flow rate across the collection media for a specified period of time. In principle, organic vapors present in the air are absorbed on the collection media and subsequently desorbed, thermally or chemically, in the laboratory. An aliquot of the desorbed sample is then subjected to chromatographic analysis (either capillary or packed column) followed by flame ionization or mass spectrometric detection. In any case, the sorbent and/or prepacked tubes must be thoroughly precleaned, conditioned, and checked for freedom from interferences prior to use.

- Applicability - Solid sorbent cartridges can be used quite successfully to collect samples of volatile organics in ambient air and workplace environments.

Collecting Semivolatile Organice Compounds in Ambient Air Using Polyurethane Foam (Low Volume Samplers)

- Description - Foam plugs are cut from the type of PUR used for furniture upholstery, pillows and mattresses and are Soxhlet extracted with high grade hexane (pesticide quality or equivalent) prior to being fitted into specialized sampling cartridges. To sample airborne organics, a known volume of air is drawn through the collection media.

- Applicability - This procedure and modifications of this procedure have been used successfully to collect airborne chlorinated organics including pesticides, PCB's and a variety of chlorinated benzenes and phenols and is generally applicable to the measurement of such compounds in the ng/m^3 to ug/m^3 range when sensitive analytical techniques are employed (GC/Electron Capture). These methods are generally not applicable for the more volatile organic compounds (those exhibiting a vapor pressure of greater than 1 mm (Hg)).

Determination of Total Suspended Particulate in Ambient Air Using High-Volume Sampling Technique

- Description - Ambient air is drawn into a covered housing and through a filter by means of a high-volume blower at flow rates between 1.13 to 1.70 m^3/min (40 to 60 ft^3/min). Particles within the size range of 100 to 0.1 µm diameter are collected on the filter although sampler flow rate and geometry tends to favor particles of less than 60 µm aerodynamic diameter. This mass concentration of suspended particulate is computed by measuring the mass of collected particulares (gravimetric analysis) and the volume of air sampled.

- Applicability - This procedure can be used to collect total suspended particulare (TSP) matter in ambient air. The collected material may be extracted and analyzed for trace metals or particulate-related organics of low volatility. In the latter case, backup collection techniques would be advisable.

Monitoring Gas and Vapors from Test Hole

- Description - Gas samples can be withdrawn from test holes using a nonsparking probe, brass and Teflon being the most suitable. The probe is then attached to the gas inlet of the desired gas monitor such as those described for monitoring ambient air. The test holes are easily prepared by driving a metal rod (approximately 1-inch diameter) into the soil with a drive weight. Commercial bar hole-makers are available that combine the steel hole-making bar and drive weight into one unit.

- Applicability - This system is particularly adapted for rapid evaluation of waste sites for soil gas generation. When used in conjunction with a hydrocarbon analyzer or an explosimeter, it can rapidly determine the extent of a waste site or the location of a particular emission source. It is recommended that the test area be screened with a metal detector before sampling.

Monitoring Gases and Vapors from Wells

- Description - The sampling of wells for gases and vapors can be accomplished by lowering an intake probe through a sealed cap on the top of the well. The intake probe should be of a nonsparking material that will further minimize absorption of desorption effects. Teflon or glass are preferable to steel or brass in this application. The intake probe is then connected to the desired gas monitor such as those described for the collection of ambient gases.

- Applicability - Existing groundwater monitoring wells can be used to check for the presence of those gases volatilized or otherwise liberated from the groundwater. In some cases, the groundwater level will be below the top of the screened portion of the well allowing free soil gases to enter the well casing.

  Wells especially designed for soil-gas monitoring can also be placed by conventional well placement techniques. The well casing, however, is perforated the entire distance, the annular space is packed with gravel, and the top is sealed with a grout cap. The top of the casing can even be equipped with a sampling valve to allow easy coupling to the monitoring equipment.

3.3.5 Waste Sampling

Waste sampling, as described in this section, refers to the collection of samples from one or more of the following:

- Drums
- Waste piles
- Trucks
- Tanks
- Surface impoundments, lagoons, pits and ponds
- Soils.

The selection of sampling equipment and sample containers depends upon the physical state of the sample, the volume of samples required, the sample's hazardous properties, and composition. Sample equipment selection also should be based on the following considerations:

- Negative contamination: The potential for the measured analyte concentration to be artificially low because of losses from volatilization or adsorption.
- Positive contamination: The potential for the measured analyte to be artifically high because of leaching or the introduction of foreign matter into the sample by particle fallout or gaseous air contaminants.
- Cross contamination: A type of positive contamination caused by the introduction of part of one sample into a second sample during sampling, shipping, or storage.
- Required sample volume for physical and/or chemical analysis.
- "Ease of use" of the sampling device and containers under the conditions that will be encountered on-site. This includes the ease of shipping to and from the site, ease of deployment, and ease of cleaning.
- The degree of hazard associated with the deployment of one sampling device versus another.
- Cost of the sampling device and of the labor for its deployment.

The following sections present information on:

- Selection of sampling equipment (Section 3.3.5.1)
- Sampling procedures (Section 3.3.5.2).

Sampling of wastes (listed above) differs somewhat from ground water or wastestream sampling, as there are no obvious locations that may be sampled that are necessarily representative of the whole waste. Although in most RCRA inspection sampling, the inspectors intend to take judgemental or bias samples to locate violations, in some cases, such as RFA/RFI sampling, the inspectors would want to design a sampling plan that is sensitive to the need for representative samples.

In order for the sampling program to produce statistically valid results, the sampling plan must select the correct sampling strategy. The EPA has two requirements which apply to solid waste sampling:

- Representative samples
- Variability of samples.

Representative samples are samples which contain the average properties of the waste area. Representative samples measure the accuracy of the sampling procedure or the similarity of the sample value to the actual value. Variability of samples requires that a sufficient number of samples be collected over a sufficient period of time in order to show differences or consistency between samples. The sample variability measures the similarity of repeated sample values to each other (TEGD).

Sample collection should produce accurate and precise results for scientific assessment of the wastes in a manner acceptable to both scientific and regulatory agencies. Levels of precision and accuracy required for sample analysis vary depending upon the number of chemical contaminants found to be near regulatory thresholds. If one or more contaminants exist at concentrations near the regulatory threshold, high levels of precision and accuracy will be required. If contaminants exist at levels much below their regulatory thresholds then lower levels of accuracy and precision may be sufficient.

In order to obtain representative samples, three sample strategies have been developed and are discussed in SW-846, Test Methods for Evaluating Solid Waste.

- Simple random sampling
- Stratified random sampling
- Systematic random sampling.

Simple random sampling refers to a process where all locations in a waste area from which a sample may be collected are identified and a sufficient number of samples is randomly selected from those locations (TEGD). Stratified random sampling is used when the waste may be stratified (i.e. nonhomogeneous lagoon). Under this strategy, random samples are collected from each stratum. Systematic random sampling refers to a strategy where the initial sample intended to be collected from a waste area is randomly selected but all subsequent samples are collected at specific locations or time intervals. This method requires substantial knowledge of the waste to be effective.

Of the three sampling strategies described above, simple random sampling probably is the "option of choice" (EPA, 1986). Stratified random sampling may provide more precise analytical results if the chemical contaminants of concern are known to the extent that stratification may be implemented and a minimum of two or three samples may be taken from each stratum (TEGD).

3.3.5.1 Sampling Equipment

A variety of equipment is available for waste sample collection. Sampling equipment recommended for the collection of liquid and solid waste and soil samples are described in the following sections. Practical uses and procedures for sampling using these types of equipment also are provided. Table 3-7 summarizes the types of sampling equipment which should be used when sampling specific waste containers.

Descriptions provided for liquid and solid waste sampling equipment is adapted from Samplers and Sampling Procedures for Hazardous Waste Streams (deVera, et al 1980 and SW 846) unless otherwise indicated.

TABLE 3-7. SAMPLERS RECOMMENDED FOR VARIOUS TYPES OF WASTE

Waste Type	Recommended Sampler	Limitations
Liquids, sludges, and slurries in drums, vacuum trucks, barrels, and similar containers	Coliwasa	Not for containers more than 1.5 m(5 ft) deep.
	a) Plastic	Not for wastes containing ketones, nitrobenzene, dimethylformamide, mesityl oxide, or tetrahydrofuran[3,4].
	b) Glass	Not for wastes containing hydrofluoric acid and concentrated alkali solutions.
	c) Teflon PETE (disposable glass tube)	
Liquids and sludges in ponds, pits, or lagoons	Pond	Cannot be used to collect samples beyond 3.5 m(11.5 ft). Dip and retrieve sampler slowly to avoid bending the tubular aluminum handle.
Powdered or granular solids in bags, drums, barrels, and similar containers	a) Grain sampler	Limited application for sampling moist and sticky solids with a diameter 0.6 cm(1/4 in.).
	b) Sampling trier	May incur difficulty in retaining core sample of very dry granular materials during sampling.
Dry wastes in shallow containers and surface soil	Trowel or scoop	Not applicable to sampling deeper than 8 cm(3 in.). Difficult to obtain reproducible mass of samples.
Waste piles	Waste pile sampler	Not applicable to sampling solid wastes with dimensions greater than half the diameter of the sampling tube.
Soil deeper than 8 cm(3 in.)	a) Soil auger	Does not collect undisturbed core sample.
	b) Veihmeyer sampler	Difficult to use on stony, rocky, or very wet soil.
Wastes in storage tanks	Weighted bottle sampler	May be difficult to use on very viscous liquids.
Oil	Bacon Bomb (ASTM)	For use with oils only.

Adopted from: U.S. Envronmental Protection Agency, 1/80 - Samplers and Sampling Procedures for Hazardous Waste System

Composite Liquid Waste Sampler (Coliwasa)

The Coliwasa consists of a glass metal, or plastic tube with one end being capable of opening or closing when the tube is lowered into the sample material (EPA 1986).

The Coliwasa permits the representative sampling of multiphase wastes of a wide range of viscosity, corrosivity, volatility, and solids content. Its simple design makes it easy to use which allows for the rapid collection of samples and minimizes the exposure of the sample collector to potential hazards from the wastes.

The recommended model of the Coliwasa is shown in Figure 3-7. The main parts of the Coliwasa consist of the sampling tube, the closure-locking mechanism, and the closure system. The sampling tube consists of a 1.52-m(5-ft.) by 4.13-cm(1 5/8-in.) I.D. translucent plastic pipe, usually polyvinyl chloride (PVC) or borosilicate glass plumbing tube. The closure-locking mechanism consists of a short-length, channeled aluminum bar attached to the sampler's stopper rod by an adjustable swivel. The aluminum bar serves both as a T-handle and lock for the sampler's closure system. When the sampler is in the open position, the handle is placed in the T-position and pushed down against the locking block. This manipulation pushes out the neoprene stopper and opens the sampling tube. In the close position, the handle is rotated until one leg of the T is squarely perpendicular against the locking block. This tightly seats the neoprene stopper against the bottom opening of the sampling tube and positively locks the sampler in the closed position. The closure tension can be adjusted by shortening or lengthening the stopper rod by screwing it in or out of the T-handle swivel. The closure system of the sampler consists of a sharply taped neoprene stopper attached to a 0.95-cm (3/8-in.) O.D. rod, usually PVC. The upper end of the stopper rod is connected to the swivel of the aluminum T-handle.

Uses

The plastic Coliwasa is used to sample most containerized liquid wastes except wastes that contain ketones, nitrobenzene, dimethylforamide, mesityl oxide, and tetrahydrofuran.

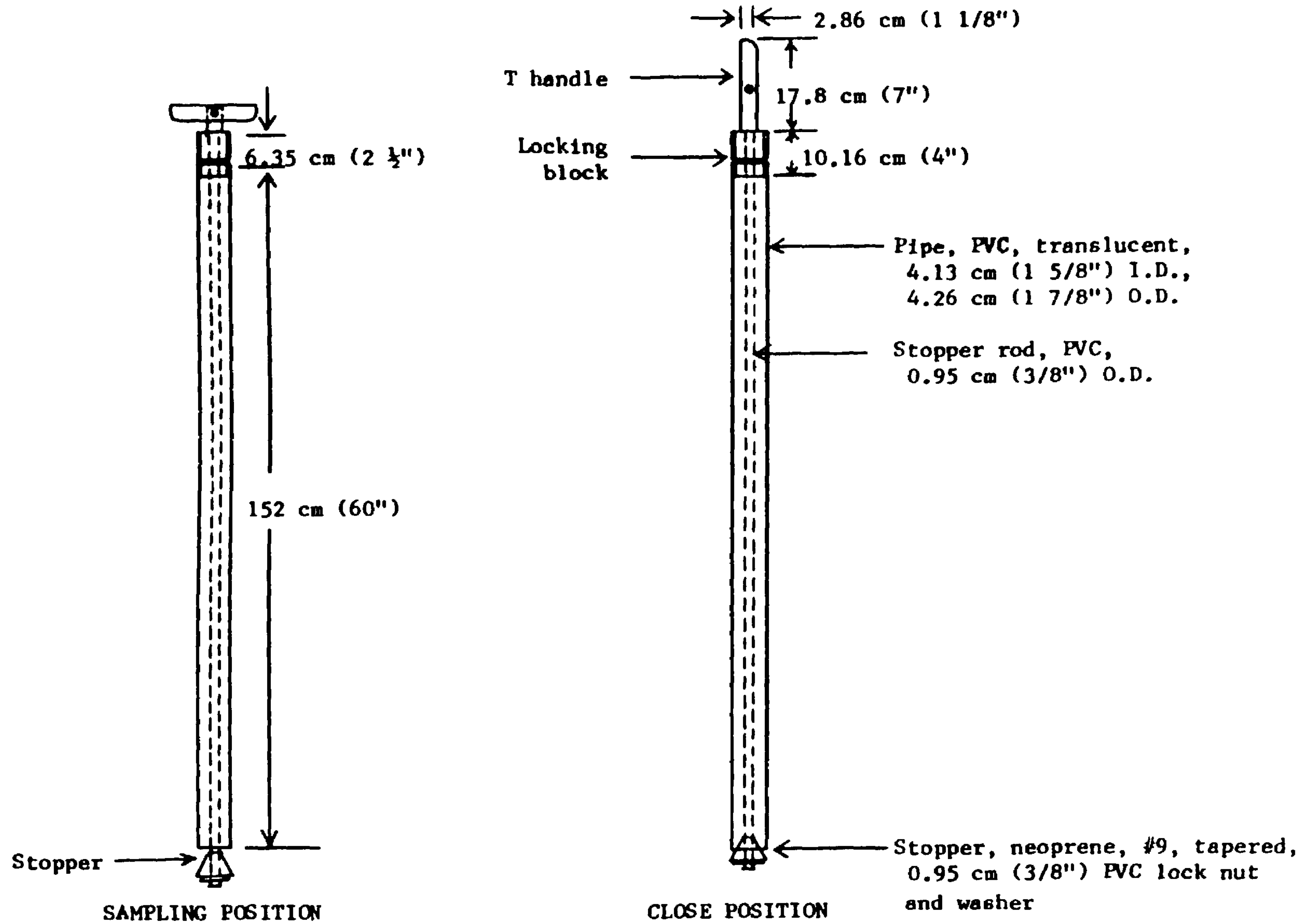


FIGURE 3-7. COMPOSITE LIQUID WASTE SAMPLER (COLIWASA)

The glass Coliwasa or glass tube is used to sample all other containerized liquid wastes that cannot be sampled with the plastic Coliwasa except strong alkali and hydrofluoric acid solutions.

Procedure for Use

1. Choose the plastic or glass Coliwasa for the liquid waste to be sampled and assemble the sampler as shown in Figure 3-8.
2. Make sure that the sampler is clean.
3. Check to make sure the sampler is functioning properly. Adjust the locking mechanism if necessary to make sure the neoprene rubber stopper provides a tight closure.
4. Wear necessary protective clothing and gear and observe required sampling precautions.
5. Put the sampler in the open position by placing the stopper rod handle in the T-position and pushing the rod down until the handle sits against the sampler's locking block.
6. Slowly lower the sampler into the liquid waste. (Lower the sampler at a rate that permits the levels of the liquid inside and outside the sampler tube to be about the same. If the level of the liquid in the sampler tube is lower than that outside the sampler, the sampling rate is too fast and will result in a nonrepresentative sample).
7. When the sampler stopper hits the bottom of the waste container, push the sampler tube downward against the stopper to close the sampler. Lock the sampler in the close position by turning the T handle until it is upright and one end rests tightly on the locking block.
8. Slowly withdraw the sampler from the waste container with one hand while wiping the sampler tube with a disposable cloth or rag with the other hand.
9. Carefully discharge the sample into a suitable sample container by slowly opening the sampler. This is done by slowly pulling the lower end of the T handle away from the locking block while the lower end of the sampler is positioned in a sample container.
10. Cap the sample container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.
11. Unscrew the T handle of the sampler and disengage the locking block. Clean sampler on site or store the contaminated parts of the sampler in a plastic storage tube for subsequent cleaning. Store used rags in plastic bags for subsequent disposal.
12. Deliver the sample to the laboratory for analysis.

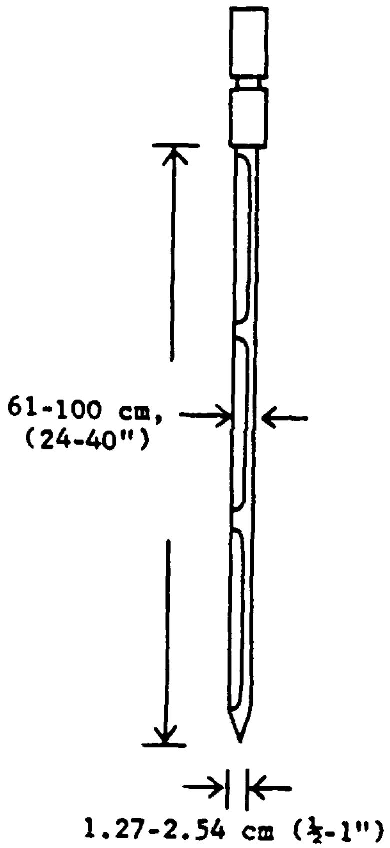


FIGURE 3-8. GRAIN SAMPLER

Solid Waste Samplers

A number of tools are available for sampling solid substances. The grain sampler, sampling trier, and the trowel or scoop are the most suitable solid waste samplers.

- Grain Sampler

The grain sampler (Figure 3-8) consists of two slotted telescoping tubes, usually made of brass or stainless steel. The outer tube has a conical, pointed tip on one end that permits the sampler to penetrate the material being sampled. The sampler is opened and closed by rotating the inner tube. Grain samplers are generally 61 to 100 cm (24 to 40 in.) long by 1.27 to 2.54 cm (1/2 to 1 in.) in diameter, and they are commercially available at laboratory supply houses.

Uses

The grain sampler is used for sampling powdered or granular wastes or materials in bags, fiberdrums, sacks or similar containers. This sampler is most useful when the solids are no greater than 0.6 cm (1/4 in.) in diameter.

Procedure for Use

1. While the sampler is in the close position, insert it into the granular or powdered material or waste being sampled from a point near a top edge or corner, through the center, and to a point diagonally opposite the point of entry.
2. Rotate the inner tube of the sampler into the open position.
3. Wiggle the sampler a few times to allow materials to enter the open slots.
4. Place the sampler in the close position and withdraw from the material being sampled.
5. Place the sampler in a horizontal position with the slots facing upward.
6. Rotate and slide out the outer tube from the inner tube.
7. Transfer the collected sample in the inner tube into a suitable sample container.

8. Collect two or more core samples at different points and combine the samples in the same container.

9. Cap the sample container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

10. Clean or store the sampler in plastic bag for subsequent cleaning.

11. Deliver the sample to the laboratory for analysis.

- Sampling Trier

A typical sampling trier is a long tube with a slot that extends almost its entire length. The tip and edges of the tube slot are sharpened to allow the trier to cut a core of the material to be sampled when rotated after insertion into the material. Sampling triers are usually made of stainless steel with wooden handles. They are about 61 to 100 cm (24 to 40 in.) long and 1.27 to 2.54 cm (1/2 to 1 in.) in diameter. They can be purchased readily from laboratory supply houses.

Uses

The use of the trier is similar to that of the grain sampler discussed above. It is preferred over the grain sampler when the powdered or granular material to be sampled is moist or sticky.

In addition, the sampling trier can be used to obtain soft or loosened soil samples up to a depth of 61 cm (24 in.) as outlined below.

Procedure for Use

1. Insert the trier into the waste material at a 0 to 45° angle from horizontal. This orientation minimizes the spillage of sample from the sampler. Extraction of samples might require tilting of the containers.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. Transfer the sample into a suitable container with the aid of a spatula and/or brush.

5. Repeat the sampling at different points. Two or more times and combine the samples in the same sample container.

6. Cap the sample container; attach the label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

7. Wipe the sampler clean, or store it in a plastic bag for subsequent cleaning.

8. Deliver the sample to the laboratory for analysis.

- Trowel or Scoop

The garden variety-trowel with a 7 by 13 cm blade and a sharp tip or the more curved and enclosed laboratory scoop are frequently for solid waste collection. Stainless steel or polypropylene scoops are preferred for sample collection.

Uses

An ordinary zinc-plated garden trowel can be used in some cases for sampling dry granular or powdered materials in bins or other shallow containers. The laboratory scoop, however, is a superior choice. It is usually made of materials less subject to corrosion or chemical reactions, thus lessening the probability of sample contamination.

The trowel or scoop can also be used in collecting top surface soil samples.

Procedure for Use

1. At regular intervals, take small, equal portions of sample from the surface or near the surface of the material to be sampled.

2. Combine the samples in a suitable container.

3. Cap the container; attach the label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.

4. Deliver the sample to the laboratory for analysis.

- Waste Pile Sampler

A waste pile sampler (Figure 3-9) is essentially a large sampling trier. It is commercially available, but it can be easily fabricated from sheet metal or plastic pipe.

Uses

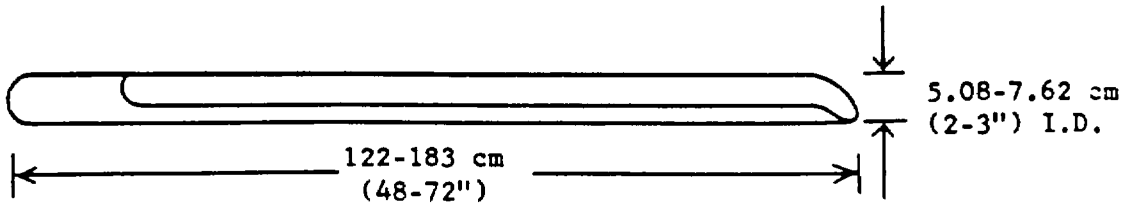
The waste pile sampler is used for sampling wastes in large heaps with cross-sectional diameters greater than 1 m(39.4 in.). It can also be used for sampling granular or powdered wastes or materials in large bins, barges, or silos where the grain sampler or sampling trier is not long enough. This sampler does not collect representative samples when the diameters of the solid particles are greater than half the diameter of the tube.

Procedure for Use

1. Insert the sampler into the waste material being sampled at 0 to 45° from horizontal.
2. Rotate the sampler two or three times in order to cut a core of the material.
3. Slowly withdraw the sampler, making sure that the slot is facing upward.
4. Transfer the sample into a suitable container with the aid of a spatula and/or brush.
5. Repeat the sampling at different sampling points two or more times and combine the samples in the same sample container in step 4.
6. Cap the container; attach label and seal; record in field log book; and complete sample analysis request sheet and chain of custody record.
7. Wipe the sampler clean or store it in a plastic bag for subsequent cleaning.
8. Deliver the sample to the laboratory for analysis.

Pond Sampler

The pond sampler (Figure 3-10) consists of an adjustable clamp attached to the end of a two or three piece telescoping aluminum tube that serves as



Waste pile sampler.

FIGURE 3-9. WASTE PILE SAMPLER

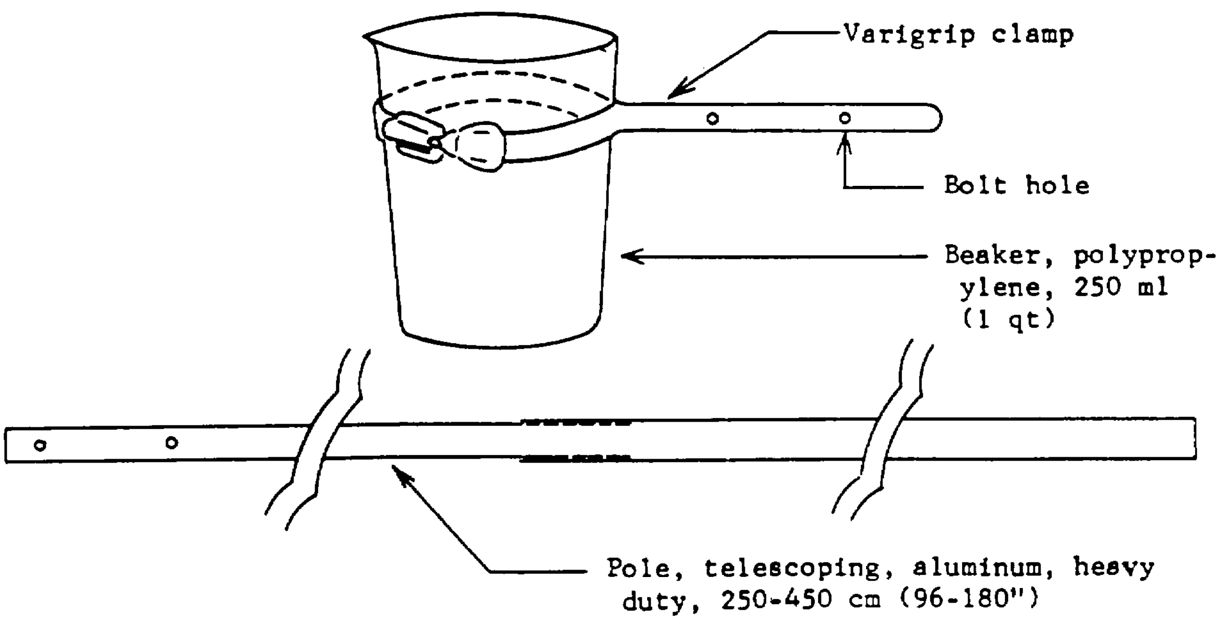


FIGURE 3-10. POND SAMPLER

the handle. The clamp is used to secure a sampling beaker. The sampler is not commercially available, but it is easily and inexpensively fabricated.

Uses

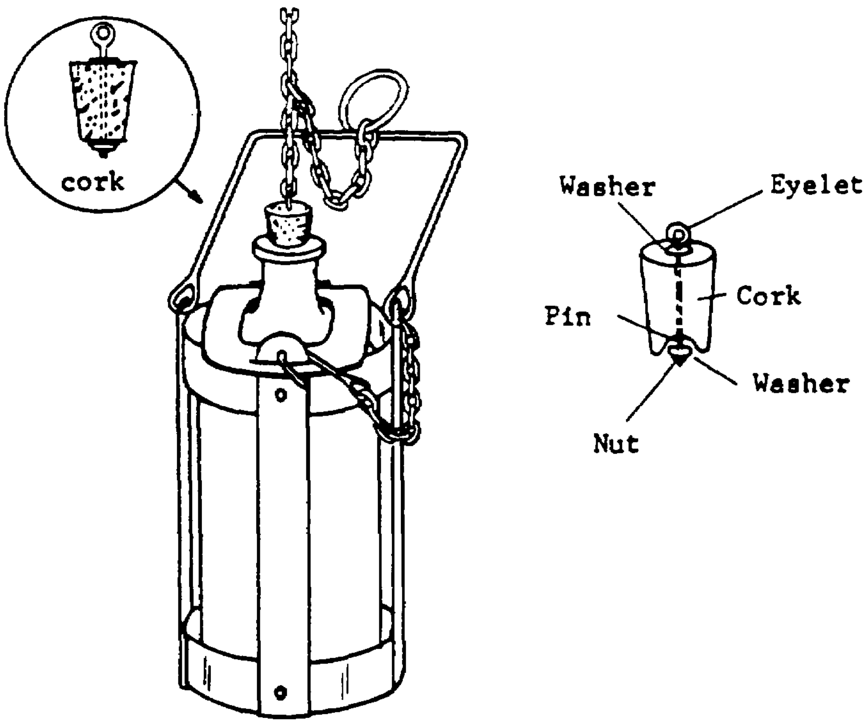
The pond sampler is used to collect liquid waste samples from disposal ponds, pits, lagoons, and similar reservoirs. Grab samples can be obtained at distances as far as 3.5 m(11 1/2 ft) from the edge of the ponds. The tubular aluminum handle may bow when sampling very viscous liquids if sampling is not done slowly.

Procedure for Use

1. Assemble the pond sampler. Make sure that the sampling beaker and the bolts and nuts that secure the clamp to the pole are tightened properly.
2. With proper protective garment and gear, take grab samples from the pond at different distances and depths.
3. Combine the samples in one suitable container.
4. Cap the container; label and affix the seal; record in field log book; and complete sample analysis request sheet and chain of custody record.
5. Dismantle the sampler; wipe the parts with terry towels or rags and store them in plastic bags for subsequent cleaning. Store used towels or rags in garbage bags for subsequent disposal.
6. Deliver the sample to the laboratory for analysis.

- Weighted Bottle Sampler

This sampler (Figure 3-11) consists of a bottle, usually glass, a weight sinker, a bottle stopper, and a line that is used to open the bottle and to lower and raise the sampler during sampling. There are a few variations of this sampler but the ASTM sampler, which uses a metallic bottle basket that also serves as weight sinker, is preferred. The weighted bottle sampler can either be fabricated or purchased.



1000-ml (1-quart) weighted
bottle catcher

FIGURE 3-11. WEIGHTED BOTTLE SAMPLER

Uses

The weighted bottle sampler can be used to sample liquids in storage tanks, wells, sumps, or other containers that cannot be adequately sampled with a Coliwasa. The sampler cannot be used to collect liquids that are incompatible or that react chemically with the weight sinker and line.

Procedure for Use

1. Assemble the weighted bottle sampler.

2. Using protective sampling equipment, in turn, lower the sampler to proper depths to collect the following samples:

   a) upper sample - middle of upper third of tank contents.
   b) middle sample - middle to tank contents.
   c) lower sample - near bottom of tank contents.

3. Pull out the bottle stopper with a sharp jerk of the sampler line.

4. Allow the bottle to fill completely, as evidence by the cessation of air bubbles.

5. Raise the sampler and retrieve and cap the bottle. Wipe off the outside of the bottle with a terry towel or rag. The bottle can serve as the sample container.

6. Label each of the three samples collected; affix seal; fill out sample analysis request sheet and chain of custody record; record in the field log book.

7. Clean onsite or store contaminated sampler in a plastic bag for subsequent cleaning.

8. Deliver the sample to the laboratory for analysis . Instruct the laboratory to perform analysis on each sample or a composite of the samples.

Soil Sampling

A variety of sampling equipments exists for the collection of soil samples. The information describing equipment available for surface and subsurface soil sample collection has been adapted from Soil Sampling Protocol (Mason, 1983) unless otherwise indicated.

Surface soil sampling can be divided into two categories -- the upper 15 cm and the upper meter. The very shallow pollution such as that found downwind from a new source or at sites of recent spills of relatively insoluble chemicals can be sampled by use of one of the methods listed below.

- Sampling with a Soil Punch

A number of studies of surface soils have made use of a punch or thin walled steel tube that is 15 to 20 cm long to extract short cores from the soil. The tube is driven into the soil with a wooden mallet; the core and the tube are extracted; the soil is pushed out of the tube into a stainless steel mixing bowl and composited with other cores. Two alternates are the short King-tube samplers or the tube type density samplers used by the Corps of Engineers. (These sampling devices can be supplied by any field equipment company or by agricultural equipment companies.) The latter sampler is machined to a predetermined volume and is designed to be handled and shipped as a soil-tube unit. A number of similar devices are available for collecting short cores from surface soils.

The soil punch is fast and can be adapted to a number of analytical schemes provided precautions are taken to avoid contamination during shipping and in the laboratory. An example of how this method can be adapted would be to use the system to collect samples for volatile organic chemical analysis. The tubes could be sealed with a Teflon plug and coated with a vapor sealant such as paraffin or, better yet, some non-reactive sealant. These tubes could then be decontaminated on the outside and shipped to the laboratory for analyses.

- Ring Sampler

The ring sampler is a seamless steel ring, approximately 15 to 30 cm in diameter, is driven into the soil to a depth of 15 to 20 cm. The ring is extracted as a soil-ring unit and the soil removed for analysis. These large cores should be used where the results are going to be expressed on a per unit area basis. This allows a constant area of soil to be collected each time. Removal of these cores is often difficult in very loose sandy soil and in very tight clayey soils. The loose soil will not stay in the ring. The clayey soil is often difficult to break loose from the underlying soil layers thus the ring must be removed with a shovel.

This device has not been used extensively for collecting samples for chemical analysis but the technique should offer a useful method for collecting samples either for area contamination measurements or for taking large volume samples.

- Scoop or Shovel Sampling

Perhaps the most undesirable sample collection device is the shovel or scoop. This technique is often used in agriculture but when samples are being taken for chemical pollutants, the inconsistencies are too great. Samples can be collected using a shovel or trowel if area and/or volume are not critical. Usually the shovel is used to mark out a boundary of soil to be sampled. The soil scientist attempts to take a constant depth of soil but the reproducibility of sample sizes is poor; thus the variation is often considerably greater than with one of the methods listed above.

Shallow Subsurface Sampling

Precipitation may move surface pollutants into the lower soil horizons or move them away from the point of deposition by surface runoff. Sampling pollutants that have moved into the lower soil horizons requires the use of a device that will extract a longer core than can be obtained with the short probes or punches. Three basic methods are used for sampling these deeper soils:

- Soil probes or soil augers
- Power driven corers
- Trenching.

The soil probe collects 30 or 45 cm of soil in intact, relatively undisturbed soil cores whereas the auger collects a "disturbed" sample in approximately the same increments as the probe. Power augers can use split spoon samplers to extract cores up to 60 cm long. With special attachments longer cores can be obtained with the power auger if this is necessary.

- Soil Probes and Hand Augers

Two standards tools used in soil sampling are the soil probe (often called a King-tube) and the soil auger. These tools are designed to acquire samples from the upper two meters of the soil profile. The soil probe is nothing more than a stainless steel or brass tube that is sharpened on one end and fitted with a long, T shaped handle. These tubes are usually approximately 2.5 cm inside diameter although larger tubes can be obtained. The cores collected by the tube sampler or soil probe are considered to be "undisturbed" samples although in reality this is probably not the case. The tube is pushed into the soil in approximately 20 to 30 cm increments. The soil core is then removed from the probe and placed in either the sample container or in a mixing bowl for compositing.

The auger is approximately 3 cm in diameter and is used to take samples when the soil probe will not work. The samples are "disturbed"; therefore, this method should not be used when it is necessary to have a core to examine or when very fine detail is of interest to the scientist. The auger is twisted or screwed into the soil then extracted. Because of the length of the auger and the force required to pull the soil free, only about 20 to 30 cm maximum length can be extracted at one time. In very tight clays it may be necessary to limit the length of each pull to about 10 cm. Consecutive samples are taken from the same hole thus cross contamination is a real possibility. The soil is compacted into the threads of the auger and must be extracted with a stainless steel spatula.

Larger diameter augers such as the bucket auger, the Fenn auger and the blade augers can also be used if larger samples are needed. These range is size from 8 to 20 cm in diameter.

If distribution of pollutant with depth is of interest, the augers and the probes are not recommended because they tend to contaminate the lower samples with material from the surface. The probe is difficult to decontaminate without long bore brushes and some kind of washing facility. One alternative is to take several waste cores at each site prior to collecting the actual samples. This allows the probe tube to be cleaned by the scouring action of soil at similar concentrations to those found in the sample taken. This should remove any contamination leftover from previous locations. Where there is a potential for litigation, decontamination is essential to avoid any question about cross contamination. The augers have some of the same decontamination problems but the open thread surfaces allow easier access to the collection surfaces; therefore, they are easier to clean. See Section 7.8 for more detail on decontamination procedures.

One final warning about the use of the hand augers and soil probes. There are many soil scientists with back problems that have resulted from trying to extract a tool that has been inserted too far into the soil. A foot jack is a necessary accessory if these tools are to be used. The foot jack allows the tube to be removed from the soil without use of the back muscles.

Sampling Trier

The sampling trier was described previously in Section 3.5.1.2.

This sampler can be used to collect soil samples at a depth greater than 8 cm(3 in.). The sampling depth is determined by the hardness and types of soil being sampled. This sampler can be difficult to use in stony, dry, very heavy, or sandy soil. The collected sample tends to be slightly compacted, but this method permits observation of the core sample before removal (deVera et al 1980).

Veihmeyer Soil Sampler

The Veihmeyer Soil Sampler consists of chromium-molybdenum steel tubes (Figure 3-12).

The sampler comes in various standard lengths from 0.91 to 4.9 m(3 to 16ft.) and calibrated every 30.48 cm(12 in.). Longer tubes can be obtained on special order. Different points are also available for different types of soil and sampling. Each point is shaped to penetrate specific types of soil without pushing the soil ahead of it, thus preventing the core from compacting in the tube. The standard point is adequate for most general sampling purposes. The inside taper of each point is designed to keep the sample from

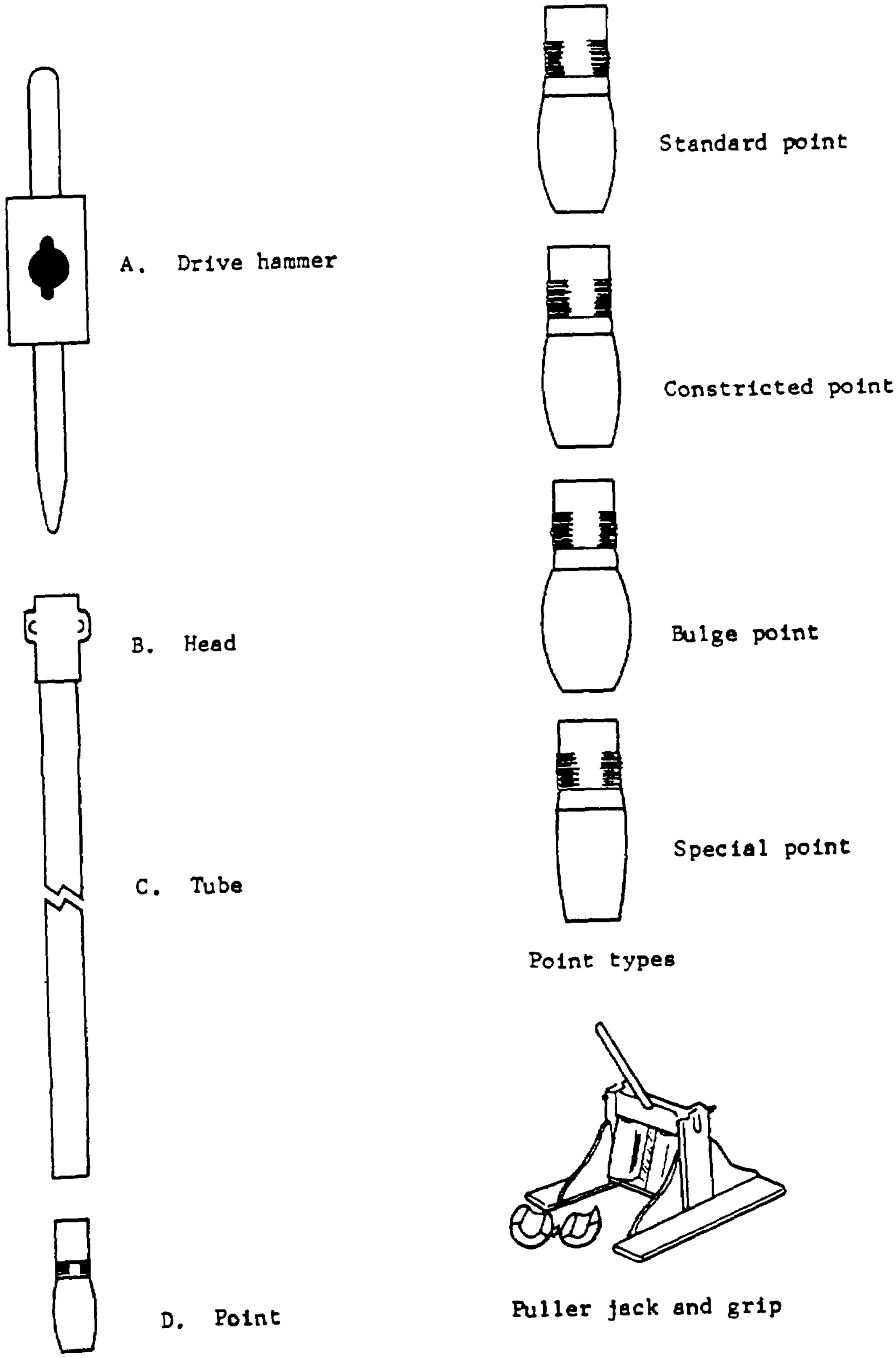


FIGURE 3-12. VEIHMEYER SAMPLER

being sucked out of the tube as it is pulled from the ground. The drive head protects the top of the tube from deforming when the tube is driven into the ground with the drive hammer. The hammer doubles as a drive weight and handle when pulling the sampler from the ground. When the sampler tube cannot be pulled easily from the ground, a special puller jack and grip are also available. Specifications for the various parts of the Veihmeyer sampler are given as follows:

Points	Chrome-molly steel, heat-treated. Includes a standard point for general use, a constricted point for deep sampling in heavy clay (keeps core from being sucked out of the tube), a bulge point for shallow sampling in heavy clay, and a special point for dry sand.
Drive hammer . .	Standard weight is 6.8 (15 lb.).
Tubes . .	Chrome-molly steel. Maximum length is 4.9 m (16 ft.).
Head . .	Chrome-molly steel, heat-treated.
Puller jack . .	Cast aluminum frame with steel roller assembly and handle.
Grip . .	Chrome-molly steel, heat-treated.

Uses

The Veihmeyer sampler is recommended for core sampling of most types of soil. It may not be applicable to sampling stony, rocky, or very wet soil.

Procedure for Use

1. Assemble the sampler by screwing in the tip and the drive head on the sampling tube.

2. Insert the tapered handle (drive guide) of the drive hammer through the drive head.

3. Place the sampler in a perpendicular position on the soil to be sampled.

4. With the left hand holding the tube, drive the sampler into the ground to the desired sampling depth by pounding the drive head with the drive hammer. Do not drive the tube further than the tip of the hammer's drive guide.

5. Record the length of the tube that penetrated the ground.

6. Remove the drive hammer and fit the keyhold-like opening on the flat side of the hammer onto the drive head. In this position, the hammer serves as a handle for the sampler.

7. Rotate the sampler at least two revolutions to shear off the sample at the bottom.

8. Lower the sampler handle (hammer) until it just clears the two ear-like protrusions on the drive head and rotate about 90°.

9. Withdraw the sampler from the ground by pulling the handle (hammer) upwards. When the sampler cannot be withdrawn by hand, as in deep soil sampling, use the puller jack and grip.

10. Dislodge the hammer from the sampler; turn the sampler tube upside down; tap the head gently against the hammer; and carefully recover the sample from the tube. The sample should slip out easily.

11. Store the core sample, preferably, in a rigid, transparent, or translucent plastic tube when observation of soil layers is to be made. The use of the tube will keep the sample relatively undisturbed. In other cases, use a 1000-or 2000-ml (1-qt. or 1/2-gal) sample container to store the sample.

12. Collect additional core samples at different points.

13. Label the samples; affix the seals; record in the field log book; complete analysis request sheet and chain of custody record; and deliver the samples to the laboratory for analysis (deVera et al, 1980).

- Power Augers and Core Samplers

These truck or tripod mounted tools are used for collecting samples to depths greater than approximately 30 cm. Standard ASTM methods for use of these tools are available from the American Society for Testing and Materials or can be found at any college or university library.

Sampling for Underground Plumes

This type of sampling is perhaps the most difficult of all of the soil sampling methods. Often it is conducted along with groundwater and hydrological sampling. The equipment required usually consists of large, vehicle mounted augers and coring devices although there are some small tripod mounted coring units available that can be carried by several men using backpacks.

Usual Procedure for Underground Plume Sampling

The procedure listed here closely follows ASTM method D1586-67 in many respects. The object of the sampling is to take a series of 45.7 cm (18 in) or 61 cm (24 in) undisturbed cores with a split spoon sampler. (Longer cores can be obtained by combining several of the shorter tubes into one long split spoon.) A 15.2 cm (6 in) auger is used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augered hole and the core extracted.

The ASTM manual calls for the use of a 63.5 kg (140 lb) hammer to drive the split spoon. The hammer is allowed to free fall 76 cm (30 in) for each flow to the spoon. The number of blows required to drive the spoon 15.2 cm (6 in) is counted and recorded. The blow counts are a direct reflection of the density of the soil and can be used to obtain some information on the soil structure below surface. Unless this density information is needed for interpretive purposes, it may not be necessary to record the flow counts. In soft soils the split spoon can often be forced into the ground by the hydraulic drawdown on the drill rig. This is faster than the hammer method and does not require the record keeping necessary to record the flowcounts. Most commercial drilling companies have the equipment and the experience required to conduct this type of sampling with some supervision from the field scientist.

Samples should be collected at least every 1.5 meters (5 ft) or in each distinct stratum. Additional samples should be collected where sand lenses or thin silt and sand layers appear in the profile. This sampling is particularly important when information on pollution migration is critical. Soluble chemicals are likely to move through permeable layers such as sand lenses. This appears to be especially important in tight clay layers where the main avenue of water movement is through the porous sandy layers.

Detailed core logs should be prepared by the technical staff present at the site during the sampling operation. These logs should note the depth of sample, the length of the core and the depth of any features of the soil such as changes in physical properties, color changes, the presence of roots, rodent channels, etc. If chemical odors are noted or unusual color patterns are detected, these should be noted also. Blow counts from the hammer should be recorded on the log along with the data mentioned above.

The procedure using samples collected every 1.5 meters (5 ft) is most effective in relatively homogeneous soils. A variation in the method that is preferred by soil scientists is to collect samples of every distinct layer in the soil profile. Large layers may be sampled at several points if they are unusually thick. A disadvantage of this approach is the cost for the analyses of the additional samples acquired at a more frequent interval. The soil horizons or strata are the avenues through which chemical pollutants are likely to migrate. Some are more permeable than others and are thus more likely to contain traces of the chemicals if they are moving through the soil. Generally speaking, the sands and gravels are more prone to contamination than are the clays because of increased permeability. This is especially true out on the leading edges of the plume and shortly after a pollutant begins to move. Low levels found in the sand and gravel layers can often serve as a warning of a potential problem at a later date.

Decontamination of the large equipment required for plume sampling is difficult but necessary if the study is to be usable. The staged sampling using the auger then the split spoon helps reduce the chances of serious cross contamination. The auger carries considerable soil in the threads of the bit. This can only be removed with high pressure hoses.

A disadvantage of this type of sampling is the impact of the vehicle on yards and croplands. Special care must be taken to protect yards, shrubs, fences and crops. The yards must be repaired, all holes backfilled and all waste removed. Plastic sheeting should be used under all soil handling operations such as subsampling, compositing and mixing.

3.3.5.2 Sampling Procedures

Specific sampling procedures are required for safe and representative sample collection from waste containers. The types of waste containers which may be included in a sampling program are:

- drums
- trucks
- surface impoundments (i.e. ponds, lagoons)
- waste piles
- tanks
- soils.

The following section describes procedures for sample collection from these waste containers. The information has been adapted from Samplers and Sampling Procedures for Hazardous Waste Streams (deVera et al, 1980). Table 3-8 provides recommended sampling points for each of these waste containers.

Sampling a Drum

Drums containing liquid wastes can be under pressure or vacuum. A bulging drum usually indicates that it is under high pressure and should not be sampled until the pressure can be safely relieved. A heavily corroded or rusted drum can readily rupture and spill its contents when disturbed; it should only be sampled with extreme caution. Opening the bung of a drum can produce a spark that might detonate an explosive gas mixture in the drum. This situation is difficult to predict and therefore, the inspector should always request the owner/operator of the facility to open the drums. The need for full protective sampling equipment cannot be overemphasized when sampling a drum; Level B protection is recommended. The following steps should be observed when opening a drum.

1. Position the drum so that the bung is up (drums with the bung on the end should be positioned upright; drums with bungs on the side should be laid on its side, with the bungs up).
2. Allow the contents of the drum to settle.
3. Slowly loosen the bung with a bung wrench, allowing any gas pressure to release.
4. Remove the bung and collect a sample through the bung hole with a Coliwasa or a disposable glass tube, as directed in Section 4.
5. When there is more than one drum of waste at a site, segregate and sample the drums according to waste types.

TABLE 3-8. SAMPLING POINTS RECOMMENDED FOR MOST WASTE CONTAINERS

Container Type	Sampling Point
Drum, bung on one end	Withdraw sample through the bung opening.
Drum, bung on side	Lay drum on side with bung up. Withdraw sample through the bung opening.
Vacuum truck and similar containers	Withdraw sample through open hatch. Sample all other hatches.
Pond, pit, lagoons.	Divide surface area into an imaginary grid.[a] Take three samples, if possible: one sample near the surface, one sample at mid-depth or at center, and one sample at the bottom. Repeat the sampling at each grid over the entire pond or site.
Waste pile	Withdraw samples through at least three different points near the top of pile to points diagonally opposite the point of entry.
Storage tank	Sample from the top through the sampling hole. If not possible, sample from the bottom valve. (Request that facility personnel open and close the valves).
Soil	Divide the surface area into an imaginary grid.[a] Sample each grid. Grid samples may be composited.

[a]The number of grid is determined by the desired number of samples to be collected, which when combined should give a representative sample of the wastes.

Source: deVera et al, 1980.

Sampling a Vacuum Truck

Sampling a vacuum truck requires the person collecting the sample to climb onto the truck and walk along a narrow catwalk. In some trucks, it requires climbing access rungs to the tank hatch. These situations present accessibility problems to the sample collector, who most usually wear full protective sampling gear. Preferably, two persons should perform the sampling: One person should do the actual sampling and the other should hand the sampling device, stand ready with the sample container, and help deal with any problems. The sample collector should position himself to collect samples only after the truck driver has opened the tank hatch. The tank is usually under pressure or vacuum. The driver should open the hatch slowly to release pressure or to break the vacuum.

1. Let the truck driver open the tank hatch.

2. Using protective sampling gear, assume a stable stance on the tank catwalk or access rung to the hatch.

3. Collect a sample through the hatch opening with a Coliwasa or glass tube.

4. If the tank truck is not horizontal, take one additional sample each from the rear and front clean out hatches and combine all three samples in one sample container.

5. When necessary, carefully take sediment sample from the tank through the drain spigot.

Sampling a Pond

Storage or evaporation ponds for hazardous wastes vary greatly in size from a few to a hundred meters. It is difficult to collect representative samples from the large ponds without incurring huge expense and assuming excessive risks. Any samples desired beyond 3.5m (11 1/2 ft) from the bank may require the use of a boat, which is very risky, or the use of a crane or a helicopter, which is very expensive. The information sought must be weighed against the risk and expense of collecting the samples. The pond sampler described in Section 4 can be used to collect samples as far as 3.5 m(11-1/2 ft) from the bank. Ponds often separate into various layers; it is important to collect samples from the influent wastestream, the top layer in the pond, and the sludge layer that settles out.

Sampling Soil

The techniques of soil sampling are numerous. The degree of complexity in the soil sampling plan will depend on the purpose of the sampling. If the inspector is merely trying to locate the contaminant, biased sampling is permissible. If the inspector is trying to delineate the extent of contamination, more sampling will be required. The procedures outlined below are adopted from ASTM methods. The procedures are consistent with the hazardous waste management objective of collecting soil samples to determine the amount of hazardous material deposited on a particular area of land or to determine the leaching rate of the material and/or determine the residue level on the soil. Elaborate statistically designed patterns have been designed for sampling soils. If one of these patterns is to be used, a good statistics book may have to be consulted. In the following procedures, soil samples are taken in a grid pattern over the entire site to ensure a uniform coverage.

1. Divide the area into an imaginary grid.
2. Sample each grid and combine the samples into one.
3. To sample up to 8 cm(3 in.) deep, collect samples with a scoop.
4. To sample beyond 9 cm(3 in.) deep, collect samples with a soil auger or Veihmeyer soil sampler.

Sampling a Waste Pile

Waste piles can range from small heaps to a large aggregates of wastes. The wastes are predominantly solid and can be a mixture of powders, granules, and chunks as large as or greater than 2.54 cm(1 in.) average diameter. A number of core samples have to be taken at different angles and composited to obtain a sample that, on analysis, will give average values for the hazardous components in the waste pile. Depending on the purpose, grid or random samplings can be used.

Sampling a Storage Tank

The collection of liquid samples in storage tanks is discussed fully in the ASTM methods. The procedure used here is adopted from one of those methods.

Sampling a storage tank requires a great deal of manual dexterity. Usually it requires climbing to the top of the tank through a narrow vertical or spiral stairway while wearing protective sampling equipment and carrying sampling paraphernalia. At least two persons must perform the sampling: one should collect the actual samples and the other should stand back, usually at the head of the stairway, and observe, ready to assist or call for help. The sample collectors must be accompanied by a representative of the company, who must open the sampling hole, usually on the tank roof.

1. Collect one sample each from the upper, middle, and lower sections of the tank contents with a weighted bottle sampler.

2. Combine the samples in one container and submit it as a composite sample.

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PART 4. PUBLIC ACCESS TO AGENCY DOCUMENTS

This part of the manual is intended to present a brief overview of relevant information concerning the public's right to access Agency documents and other material. Inspectors should keep in mind that the success of an enforcement action may hinge on the inspector's proper handling of documents and other information. Accordingly, the following discussion should not be considered a full, comprehensive description of the rules to follow or how to apply them, but should be treated as an introduction to an important component of the inspection and enforcement process. When issues or questions arise relating to this component, the inspector should immediately consult with the Regional Freedom of Information Act Officer or with the appropriate attorney in the Office of Regional Counsel.

4.1 STATUTORY PROVISIONS GOVERNING ACCESS TO AGENCY DOCUMENTS

The Freedom of Information Act (FOIA) provides the basis for most requests for access to Agency documents and information. The Act, implemented through Agency regulations, sets forth procedural and substantive requirements governing Federal agencies' disclosure of material. While the Agency maintains a policy of openness and freely discloses much of what is requested by the public, there are a number of exemptions in the Act which allow the Agency to withhold and protect from disclosure certain documents and information. The exemptions are discussed in detail in the Agency's FOIA Manual. Inspectors should remember that in the course of conducting an investigation, much of the information collected and analyzed may qualify under one or more of the FOIA's exemptions, and that withholding such information may be necessary to protect the Agency's enforcement efforts.

RCRA also addresses disclosure of certain information which may be gathered in an investigation. The statute contains special rules and procedures for documents considered as business confidential. The Agency has regulations which govern treatment of such documents, and also has developed a manual.

Inspectors should discuss with the Regional FOIA officer or ORC attorney any request or attempt by a member of the public to obtain any information concerning any aspect of an inspection. The importance of such information to a potential enforcement action and the complexity of applying information disclosure rules under FOIA and RCRA are both matters which merit the specialized attention of people trained in these areas.

4.2 DISCOVERY OF RECORDS DURING ENFORCEMENT ACTIONS

Once a civil enforcement action has been filed by the Agency, definite rules contained in the Federal Rules of Evidence control the "discovery" process which allows access to certain action, Agency regulations govern this process. Attorneys in the Office of Regional Counsel are familiar with these rules and their applicability.

4.3 CONTACTS DURING ENFORCEMENT ACTIONS

Once an enforcement case has been initiated, inspectors must not discuss the matter with the opposing party (e.g., facility owner/operator) or with others who express an interest in the case. All calls should be referred to the Office of Regional Counsel attorney handling the matter. It is vital that accurate records be made and kept of any conversation with an outside party.

While inspectors may engage in conversations with members of the public, including parties in on-going enforcement litigation, regarding matters which are not germane to a particular pending or contemplated enforcement action, inspectors should be particularly careful not to release information in such a conversation if it could be used against the Government's interests in the on-going lawsuit.

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PART 5. PREPARATION OF COMPLIANCE INFORMATION FOR AN ENFORCEMENT ACTION

Inspectors serve a key advisory role once one or more violations are detected at a facility and the Agency determines to pursue a formal enforcement action. The inspector may be designated as the lead technical representative on the case support team and is an active participant in the process. Generally, the inspector is the only member of the team who possesses first-hand, factual information about the facility. Therefore, inspectors will be called upon to offer testimonial evidence, as well as to prepare exhibits and graphics to be used before the tribunal.

There are a number of enforcement authorities and procedures that can be used in an enforcement case. In an administrative action, the Agency issues an order to the owner/operator which may assess a penalty, require compliance immediately or within a specified time, or both. Such actions involve notice to the permittee and the authorized State program if applicable, and may require the Agency to present evidence of the violation and the propriety of the remedy sought by the order before an impartial high-level agency official after known as an administrative law judge.

In addition, the enforcement authority may pursue judicial actions for civil and criminal penalties. In these cases, evidence is presented to a trial judge and the procedures and evidence are governed by the rules of the court. To be successful in a civil case, the enforcement authority must prove its case by a "preponderance of the evidence." Criminal prosecution may be sought only for knowing, intentional or willful violations and the Agency must prove its case "beyond a reasonable doubt."

5.1 PREPARING TECHNICAL INFORMATION IN ANTICIPATION OF LITIGATION

Before an enforcement action can be filed against a violator, a referral package, explaining the basis of the case, must be assembled. In order to prepare a convincing referral package, the inspector must assist Agency attorneys in marshaling the resources of the program office, reducing voluminous data and creating demonstrative evidence to support the legal theories being advocated. First, the inspector must know, in great detail, the background and compliance history of the facility in question including:

- The identification, nature and size of the business
- The appropriate environmental permits
- Summary of all apparent violations, as indicated by compliance data and inspector's observations
- Previous correspondence about problems at the facility
- A chronology of the Agency's informal attempts to return the facility to compliance
- Assemble all photographs or audio-visual recordings relevant to the facility
- An assessment of the (past, present and future) environmental impacts or significance of the facility's noncompliance, as well as any steps taken to mitigate these impacts:
  - Physical/geographical description
  - Releases or contaminants found on site
  - Environmental fate of these releases
  - Exposure of risk assessment, including impacts on public health.

Secondly, the inspector or case developer must identify other persons possessing first-hand knowledge who may also serve as witnesses. Thirdly, the inspector may be called upon to provide the technical expertise necessary to develop questions for discovery, cross-examining of the facility's witnesses and responding to discovery requests made by the defendant. Fourthly, the inspector may be involved in the preparation of special demonstrative exhibits which the Agency will introduce to help prove its case. Such exhibits may include:

- Photographic enlargements or crops of existing photos
- Color maps or charts made from the inspector's notes and memory
- Tables portraying relevant statistical projections and trends.

Finally, the inspector may be asked to track the Agency's expenses in preparing and conducting the enforcement action.

5.1.1 Extracting/Summarizing Relevant Evidence

One of the most important tasks to be undertaken by the inspector or case developer is the "packaging" of the documentary evidence in a manner which is easily recognized and comprehended by Agency counsel and possibly the tribunal itself. The inspector or case developer may be asked to review the entire compliance file and condense highly complex, technical information to its essentials.

Pieces of compliance data demonstrating a violation must be isolated from information showing compliance. Similarly, the reports and analytical results which show noncompliance with some parameters and compliance with others must be excerpted and summarized. This "chronology of noncompliance" will be of great assistance to Agency managers who are deciding whether to pursue an enforcement action, as well as Agency counsel preparing administrative or civil complaints or case briefs.

In addition to assisting in the pre-hearing stages, these abstracts or summaries may sometimes be used as evidence themselves. The Federal Rule of Evidence allow the contents of voluminous documents, recordings or photographs which cannot be conveniently examined in court to be presented in the form of charts, summaries or calculations providing that the original source of these charts and summaries is authenticated, accurate and made reasonably available to the facility (see Rule 1006). For example, a chart depicting the extent of soil contamination may be offered to show where various samples indicated the presence of pollutants. Similarly, computer printouts or other electronic data storage systems may be introduced by asking the court to take judicial notice of a computer's data compilation capabilities. Testimonial "foundation" evidence will then go to the issues of accuracy and custody rather than authentication.

Other excerpts or summary memoranda may also be admissible if they were created at a time very near the occurrence of the matter(s) in question (e.g., formal inspection reports prepared several days after the site visit), or if they are used only to illustrate or explain previous testimony or other exhibits.

5.1.2 Agency Information vs. Facility Information

In a noncriminal context, data generated by the facility which demonstrates noncompliance is preferred to data created by Agency enforcement personnel since the facility's own data may be used as an admission of fact by the facility while the accuracy of Agency data is always subject to challenge. For example, a facility's self-monitoring results which indicate ground-water violations, may support an enforcement action more conclusively than the Agency's own tests. These admissions are probably not available in the criminal context due to the Constitution's guarantee against self-incrimination.

5.2 INSPECTORS AS WITNESSES

Where records review is not available, in addition to the administrative tasks described above, the inspector's own testimony will be invaluable to the success of the enforcement action. The inspector must review his testimony with the attorney. In this capacity, the inspector will be called upon to explain his observations to the tribunal. Such testimony must be factual and credibly presented. Some helpful suggestions for providing testimony are set out in Table 5-1. Prior to serving as a witness the inspector may be requested to file an affidavit (sworn statement) on these findings and observations. Similarly, the facility may request that the inspector be "deposed" or questioned by facility counsel. For detailed litigation procedures, the inspector/enforcement officers should consult with EPA or State attorneys.

5.3 INSPECTORS AS EXPERT WITNESSES

In limited circumstances, inspectors may be asked to testify as to their expert opinions concerning technical matters of the case. Inspectors may be considered experts in Agency policy, sampling techniques, etc. However, before inspectors can offer their expert opinion on anything their qualifications must be demonstrated to the tribunal. Expertise may be established by describing the inspector's training or experience directly involving the matter in question. For example, an engineer, who has served as an inspector for 10 years and taken hundreds of samples, could be considered an expert in sampling techniques.

TABLE 5-1. EFFECTIVE TESTIMONY

- Speak loudly and clearly enough to be heard in hearing room.
- If possible, face the judges or jury when answering questions.
- The inspector should provide only the specific information asked for and should not volunteer additional information or expand the scope of the question.
- If a yes-no question is asked but neither is an appropriate answer, the inspector should say so.
- If the inspector does not understand or cannot remember an entire question, he/she should say so.
- If the inspector notices that he/she has made an error, that error should be corrected as soon as possible.
- If the inspector does not know the answer to a question, he/she should say so.
- If the inspector needs notes to recall some of his/her testimony to answer a question, request the court's permission to refer to the notes and remember that opposing counsel has a right to see them.
- The inspector should not start answering until a question is finished and should stop answering a question as soon as an objection is raised, even if he/she stops in mid-sentence.
- Remain calm when being cross-examined. Avoid displays of frustration or anger.
- During cross examination, listen for intentional misquotes and correct the opposing attorney.

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PART 6. CASE STUDIES

CASE STUDY NUMBER 1

A State inspector in a RCRA authorized State received a complaint that a company was mishandling hazardous wastes which were generated at the facility. The inspector went to the company's manufacturing facility and met with the plant manager. The inspector explained that he wanted to review company records and conduct an inspection. The manager stated that his company had "trouble" with an inspection that OSHA had conducted last year and he would not permit the inspector to come on the site.

The inspector returned to his office and wrote up a report which detailed his attempt to gain entry. The inspector discussed the matter with his supervisor who recommended that he contact the State Attorney General's Office. The attorney assigned to the hazardous waste program discussed the facts and prepared an application for an administrative search warrant. The attorney and the inspector scheduled a hearing with the court and met with the judge in his chambers. The judge reviewed the State's application and signed the warrant.

The inspector returned to the company's facility that day and presented the warrant to the plant manager. The manager permitted the inspection and the inspector found a number of violations of the rules which apply to generators of hazardous waste. The inspector took samples as specified in the warrant, offered split samples, and photographed the locations of all violations and sampling points. The inspector also copied relevant documents and received receipts for the documents and the samples. The company was sent a Notice of Violation documenting the rule violations. The company later agreed to pay a penalty for past noncompliance with these rules and also to take actions to comply with rule requirements.

CASE STUDY NUMBER 2

A State inspector in a RCRA authorized State received a complaint concerning the severing of hazardous waste. The complainant, the operator of the local sewage treatment plant, indicated that several times a month the local POTW (Publicly Owned Treatment Works) receives a "slug" of plating wastes which contain high levels of copper and zinc. This "slug" of waste kills the bacteria used in the POTW's secondary treatment process. As a result untreated effluent is discharged into a nearby river. The local sewage treatment plant has incurred significant expenses in remedying the problems caused when these plating wastes flow through the system. The complainant indicated that there are two plating companies which put waste into the sewer system. He suspects that Speedy Platers, Inc. is the company which is causing the problem.

The inspector conducted an inspection of Speedy Platers, Inc. and found numerous violations of the state hazardous waste rules. A number of barrels were being stored behind the building directly on the ground in an unshaded area. Several drums of acid and cyanide wastes were stored in close proximity inside the building. The company had not completed a personnel training program or made arrangements with local officials for assistance in the event of an emergency. The company was discharging untreated wastewaters directly into the sewer. A company official told the state inspector that the company routinely ran jobs which required copper and zinc plating. The official showed the inspector the plating lines where these jobs were completed. Conveyance pits under each of the lines were filled with wastewaters and one to two feet of accumulated sludges and other waste material. The inspector sampled the sludges in each of the conveyance pits. The inspector followed chain of custody handling procedures.

The inspector returned to his office and wrote up a report of his observations at Speedy Platers, Inc. The State then sent a Notice of Violation to the company which noted the rules which had been violated and requested the company to take actions to correct these violations. Specifically, the inspector requested that the company move the barrels stored outside to a curbed, impermeable surface; separate incompatible wastes; submit personnel training and contingency plans; and remove accumulated sludges from the conveyance pits and ship these materials offsite to a permitted disposal facility.

The results of the sample analysis later indicated that the plant's discharges were exceeding the Categorical Standards under 40 CFR 403.6. Since the concentrations harmful to the POTW were identified, the POTW increased its sampling frequency and established that the releases were upsetting the POTW and were in violation of 40 CFR 403.5 - Prohibited Discharges. The municipality informed the company of its obligation to meet the pretreatment standards, issued a notice of violation, and set a schedule for the facility to achieve compliance.

The company and the State agency entered into negotiations regarding past noncompliance at the facility. During these negotiations the company officials refused to comply with the proposed remedial actions. The indicated they would never pay a significant penalty for past noncompliance. The State attempted to negotiate a settlement but an agreement could not be reached. A civil complaint was filed in the District Court. The State Attorney General's Office began discovery in the case and conducted several depositions. During this period the Company continued to operate its plating operation without complying with the applicable rules. After another "slug" of plating wastes went through the sewer system, the State obtained an injunction ordering the Company to cease its plating operations until the hazardous waste rule violations were corrected and a pretreatment system was installed. The company closed down temporarily and during this period installed a pretreatment system. After the hearing on the injunction, the company agreed to sign a Consent Decree with the State. The Consent Decree required the company to operate the pretreatment system at all times, ship sludges and accumulated hazardous wastes off-site to a permitted hazardous waste facility and to pay a significant civil penalty to the State. The municipality brought a separate enforcement action to remedy violations of water quality standards.

CASE STUDY NUMBER 3

A reclaiming facility receives plating wastes (F006) from various plating operations. They are paid by the generators to accept the waste for treatment in their reclaiming operation. The product of the reclaiming operation is a metal concentrate which is sold to smelters as a replacement for ore.

The waste sludge is received and placed on an indoor concrete pad which the company calls the receiving area. The waste is sampled to verify its compatibility with the reclaiming process. Foreign material, wood and plastic, is removed from the waste piles prior to placement in the feed hoppers. The company claims this activity is part of the process and does not constitute storage of a hazardous waste.

The company provided information on the metal content of the sludges received for over a year and information on the economics of the operation in response to an EPA §3007 information request.

These data indicated that considerable amounts of the sludge received had metal contents below the economically viable level and some sludges had less than one third of the economically justifiable level of metals.

The State had identified the compliance problem as an unpermitted storage pile. After a follow-up inspection by EPA and review of the information from the §3007 request, EPA determined that the receiving area was an unpermitted storage area. The Agency is also challenging the reclaiming exemption for the facility when low metal content sludges are being processed/treated and alleges that the plant has processed/treated a hazardous waste without treatment permit. The Agency has issued a §3008(a) complaint for operating storage and treatment operations without permits. This allegation is based upon unique wording in the State regulations which has not yet been updated to include the new definition of solid and hazardous wastes. An Administrative Law Judge (ALJ) on the outcome of the case is pending.

CASE STUDY NUMBER 4

State review of inspection reports and records of a TSD landfill revealed a Class I violation for ground water monitoring (GWM). The State was unable to institute enforcement action due to resource/manpower limitations. In accordance with EPA's timely and appropriate enforcement response policy, EPA was required to act.

EPA contacted the State and discussed the situation, EPA then reviewed the facility's inspection reports. EPA followed this with a §3007 information request letter to the facility. Items sought included well construction and design details, boring logs, the sampling and analysis plan, quarterly sampling results and statistical calculations. Review of the received information indicated that the GWM system for the landfill was inadequate. One up gradient and two additional down-gradient wells were required. In addition, a statistical evaluation showed a significant increase in one of the indicator parameters. An assessment plan would therefore be needed, and eventually implemented.

EPA next conducted a site inspection. Although site inspections will not reveal ground water monitoring problems, other deficiencies/violations may be found and familiarity with the site is recommended when enforcement actions are envisioned.

Following the inspection, EPA personnel visited the State offices to review its files on the facility. This served to fill data gaps as well as identify any agreements or conditions the State may have with the facility including what enforcement actions may have been taken or may be under consideration. The results of this review further substantiated the violations discovered as a result of the §3007 response review.

Having clearly identified the violations and the remedies required to achieve compliance, EPA issued a §3008(a) complaint with penalties to the facility. The facility signed a consent agreement with EPA and has corrected its problems.

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7. TECHNICAL RESOURCES TO ASSIST IN CASE DEVELOPMENT

In the course of case development, it is quite possible that the inspector will need access to technical and legal assistance. In this part of the Manual a series of descriptions of possible sources of information and assistance, both inside and outside of the Agency, are presented. Under each heading information is provided on the following:

- Background on the source
- The types of information that are generally available from the source, that might be of assistance to an inspector
- Methods for accessing the required information. (This may be a contact name and address, or a procedure.)

Tabs divide each of the following sections:

1. Environmental Protection Agency
2. Environmental Photographic Interpretation Center
3. Environmental Response Team
4. Office of Research and Development
5. National Enforcement Investigations Center
6. Contract Laboratory Program
7. Technical Enforcement Support at Hazardous Waste Sites Contract
8. United States Geological Survey
9. Occupational Safety and Health Administration
10. United States Army Corps of Engineers
11. United States Coast Guard
12. Other Technical Resources.

1. ENVIRONMENTAL PROTECTION AGENCY

This section describes the respective roles and relationships of the various EPA offices that are involved with RCRA enforcement. The basic framework setting forth the responsibilities of each EPA office participating in enforcement activities was established by the Administrator's memorandum of July 6, 1982, entitled "General Operating Procedures for the Civil Enforcement Program" (GOP), and memorandum of October 27, 1982, entitled "General Operating Procedures for the Criminal Enforcement Program." (See EPA's General Enforcement Policy Compendium.) Organizational charts of the various program offices are attached.

EPA's administrative/civil enforcement program includes both compliance-oriented and legal-oriented activities. The compliance-oriented activities are primarily the responsibility of EPA's program offices, and the legal-oriented activities are principally charged to OECM and the Regional Counsel's office. Because many enforcement activities involve several aspects, these activities cannot be defined as strictly "compliance" or "legal." The responsibilities of each of these parties will change during the course of an enforcement action. Initially, when compliance related activities dominate, it will be the responsibility of the inspector to ensure that the Regional Counsel's office (and possibly OECM) are appropriately informed of developments. However, when a decision has been made to pursue legal action these coordination roles are reversed. The basic relationship between the attorney and the program office is that of attorney-client.

The basic administrative/civil enforcement functions are divided among the participating offices as follows:

EPA Regions

Program Office

- Identifies instances of noncompliance
- Establishes priorities for handling instances of noncompliance
- Evaluates the technical sufficiency of actions designed to remedy violations

- Oversees the State Enforcement Programs for timeliness and appropriateness to assure timely and valid referrals
- Identifies for formal action those cases that cannot be resolved though less formal means (e.g., Notices of Violations)
- Provides technical support necessary for developing cases and conducting litigation
- Issues warning letters
- Issues civil administrative complaints and compliance orders*
- Evaluates the appropriateness of civil penalties
- Negotiates and prepares consent agreements memorializing settlements between the Agency and respondents prior to the alleged violator's filing of an answer or failing to file an answer to an administrative complaint*
- Monitors those conditions in consent decrees and orders that require further reporting, compliance, etc.

Regional Counsel

- Acts as attorney for "client" program offices
- Assists program office in drafting or reviewing notices on non-compliance, administrative orders, or administrative complaints
- Ensures consistency of action with OECM guidance
- Attends negotiations whenever outside parties are represented by counsel
- Serves as lead attorney for the Agency in administrative proceedings originating in the Region
- Refers requests for equitable relief through the Regional Administrator to Headquarters for review and further referral to the Department of Justice and the appropriate United States Attorneys Office.

*Consultation with other offices is required.

Headquarters

Office of Solid Waste (OSW)

- Writes regulations for the identification and management of solid waste under RCRA. Also writes regulations for states to assume responsibility for implementation of Subtitle C and RCRA through proposed permitting and enforcement
- The Permits and State Programs Division tracks the progress of permit issued by the Regions and the states, and checks the quality and consistency of permits nationwide
- The Waste Management Division writes technical standards for locating, designing, and operating waste management facilities
- The Characterization and Assessment Division writes rules for identifying hazardous wastes, and evaluates the feasibility and capacity of treatment technologies as they relate to the land disposal restrictions
- The two Offices in OSW are: (1) Office of Planning, Policy, and Information: responsible for regulatory impact analyses, and other analyses related to the costs and risks of regulatory alternatives. The office also manages the Hazardous Waste Data Management System (HWDMS). (2) The Office of Program Management and Support, is responsible for staff resources development, managing the RCRA/ Superfund Hotline, managing the regulatory docket, routing FOIA requests, managing the RCRA Information Center, and coordinating OSW publications.

Office of Waste Programs Enforcement (OWPE)

- Manages the National program for compliance and enforcement under RCRA
- Provides policy direction to the Regions and the States
- Provides technical support to compliance and enforcement activities
- Identifies, assesses, and recommends action on general and specific RCRA compliance and enforcement issues
- Develops training courses for the Regions and States.
- Works with OSW to develop new regulations
- Assumes responsibility for direct management of RCRA enforcement actions that are multi-regional or of National significance
- Formulates strategies, and plans and develops program guidance for issuance to the Regional Offices and the States

- Concurs in settlements of enforcement cases*
- Develops accountability measures for the enforcement/compliance program
- Works with OECM to prepare joint guidance in areas where compliance and legal issues overlap.

Office of Enforcement and Compliance Monitoring (OECM)

- Provides legal advice regarding RCRA enforcement matters to the Assistant Administrator for Solid Waste and Emergency Response, Regional Program Offices, and Regional Counsel Offices
- Acts as lead counsel on cases of National significance
- Develops enforcement policies and guidances in conjunction with the Office of Waste Programs Enforcement
- Confers with the Department of Justice on the potential impact of enforcement policy on litigation matters
- Approves all settlements of enforcement cases*
- Evaluates and analyzes strategies and program accomplishments as National manager of EPA's enforcement and compliance monitoring functions
- Reviews all case referral packages, litigation reports, and supporting documentation
- Assists and supports the Regional Counsel attorneys and Department of Justice lead attorneys by coordinating legal activity and contributing case information to the development process.

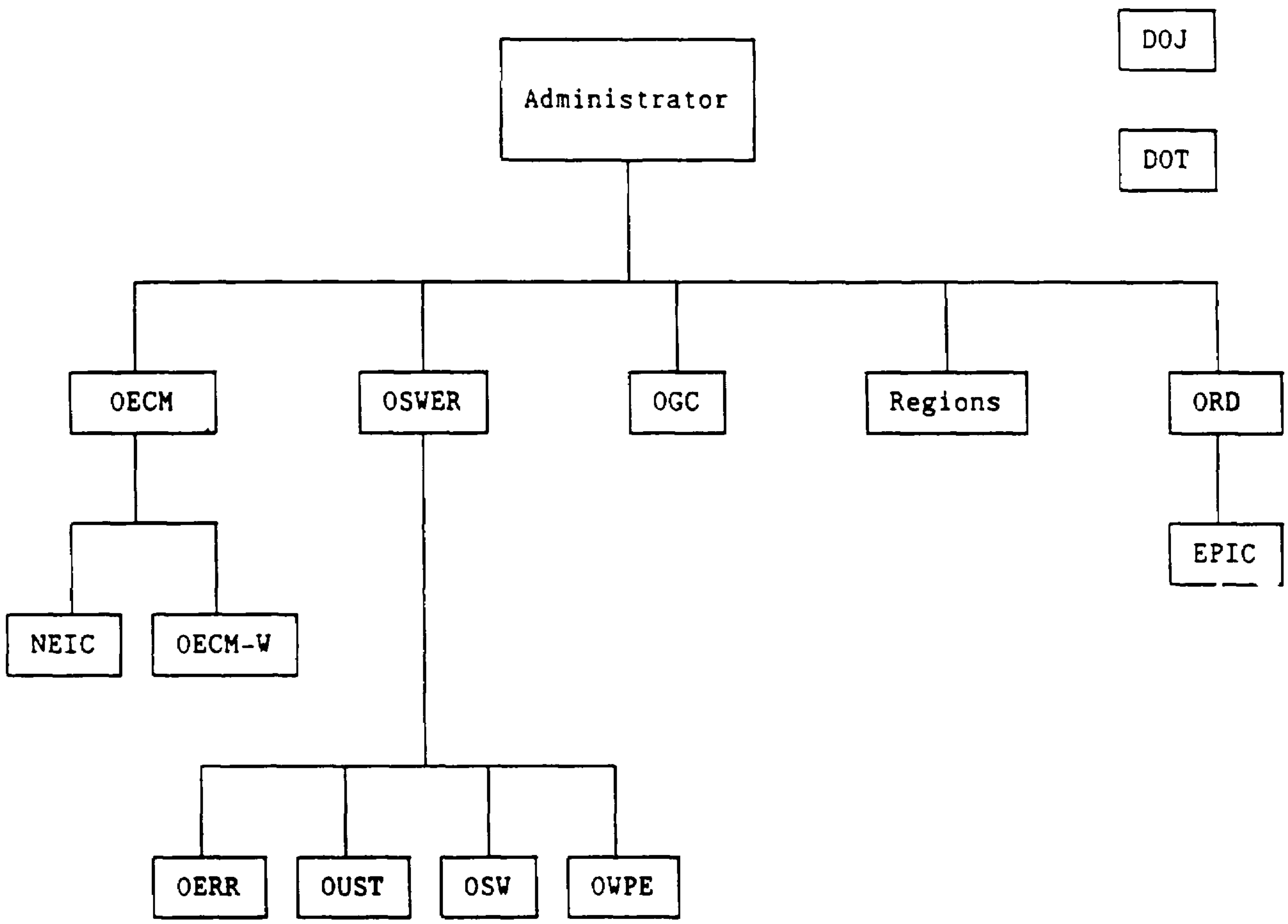
Office of General Counsel (OGC)

- Provides legal interpretation of applicable statutes and regulations to support the RCRA enforcement programs
- Has lead responsibility in consultation with OECM, for defensive litigation arising out of enforcement actions (e.g., Federal court challenges to EPA's civil penalty proceedings).

*Consultation with other offices is required.

An organizational chart of the above-mentioned offices is provided below, along with lists of the appropriate personnel and their telephone numbers. The list of numbers and names is extracted from the EPA Headquarters Telephone Directory.

ORGANIZATIONAL CHART OF EPA OFFICES INVOLVED IN RCRA ENFORCEMENT ACTIVITIES



ASSISTANT ADMINISTRATOR FOR SOLID WASTE AND EMERGENCY RESPONSE

WH-562A	Assistant Administrator	
	J. Winston Porter SE360	
	Secretary Deborah Thompson SE360	382-4610
WH-562A	Deputy Assistant Administrator	
	Jack W. McGraw SE360	
	Secretary Roz Elliot SE360	382-4610

Office of Program Management and Technology

WH-562A	Director Thomas Divine SE306	
	Secretary Rachel Hughs SE306	475-8716
WH-562A	Ground Water Task Force	
	discontinued	382-7912
WH-562A	Resource Management Staff	
	Director Thaddeus L. Juszczak, Jr. SE306M	
	Secretary Judy Newton SE306	382-4510
WH-562A	Policy and External Affairs Staff	
	Director Liz Lapointe SE306N	
	Secretary Antoinette Wren SE306	382-4617
WH-562A	Information Management Staff	
	Director Asa (Jack) Frost MLG100	
	Secretary Tiwanna Griffin MLG100	475-6761
WH-562A	Cross-Media Analysis Staff	
	Director Michael Taimi SE306N	
	Secretary Naomi Smith SE306	382-4506
WH-562A	Technology Staff	
	Meg Kelly SE242	382-4761
WH-548A	Preparedness Staff	
	Director James Makris M3103	
	Secretary Brenda Kinney M3103	475-8600

Office of Waste Programs Enforcement

	Director Bruce Diamond (Aug. '88)	
WH-527	Joe Cannon (Acting)	382-4814
WH-527	Deputy Director	
	Elaine Stanley	382-4823
WH-527	Program Management and Support Office	
	Bob Herman (Acting)	475-8250

RCRA Enforcement Division

WH-527	Director Steve Heare (Acting)	382-4808
WH-527	Guidance and Evaluation Branch	
	Ke. Giglielo (Acting)	475-8254
WH-527	Implementation and Compliance Branch	
	Tim Mott (Acting)	475-8115

CERCLA Enforcement Division

WH-527	Director Lloyd S. Guerci	382-4812
	Deputy Director	
	Francis J. Biros	382-4810
WH-527	Compliance Branch	
	Frank Russo (Acting)	382-4819

CERCLA Enforcement Division (Continued)

WH-527	Technical Support Branch	
	Mike Kosakowski, Chief	382-5611
WH-527	Guidance and Oversight Branch	
	John Cross, Chief	382-4826

Office of Emergency and Remedial Response (Superfund)

WH-548	Director Henry L. Longest, II SE393	
	Secretary Ruth Rexroth SE393	382-2180
WH-548	Deputy Director	
	Walter Kovalick, Jr. SE393	
	Secretary Kathy Robinson SE393	382-2180
WH-548	Office of Program Management	
	Clem Rastatter (Acting)	
	Deputy Director Stan Kovell	382-7910

Hazardous Site Control Division

WH-548E	Director Paul Nadeau	382-2180
	Deputy Director	
	James S. Vickery	382-4636
WH-548E	Remedial Planning Staff	
	Steve Smagin	382-4640
WH-548E	Site Policy and Guidance Branch	
	Bill Hanson (Acting)	382-2345
WH-548E	Remedial Planning and Response Branch	
	Steve Smagin Chief	382-4632
WH-548E	Design and Construction Management Branch	
	Hal Snyder, Chief	475-6707
WH-548E	State and Local Coordination Branch	
	Murray Newton	382-2443

Emergency Response Division

WH-548B	Director Timothy Fields, Jr. SE384	
	Secretary Jannie Williams SE384	475-8720
WH-548B	Deputy Director	
	Hans J. Crump-Weisner SE384	382-2188
WH-548B	Response Operations Branch	
	Bruce Engelbert Chief SE312	382-2441
WH-548B	Response Standards and Criteria Branch	
	John E. Riley Chief SE384	382-2190
WH-548B	Environmental Response Branch	
	(ERT - Edison, NJ)	8-340-6740

Hazardous Site Evaluation Division

WH-548A	Director Stephen Lingle M3103	
	Secretary Jackie Eaton M3103	475-8602
WH-548A	Deputy Director	
	Penelope Hansen (Acting) M3103	475-8602
WH-548A	Site Assessment Branch	
	Penny Hansen Chief	475-8103
WH-548A	Analytical Operations Branch	
	Joan Barnes, Chief	382-7906
WH-548A	Hazard Ranking and Listing Branch	
	Scott Parrish (Acting)	382-5632
WH-548A	Toxics Integration Branch	
	Dave Bennett (Acting)	
WH-548A	Superfund Community Relations Coordinator	
	Daphne Gemmill S278	382-2460

Office of Solid Waste

WH-562 Director Sylvia Lawrence M2804
Secretary Judith Lewis M2804..............382-4627
WH-562 Deputy Director
Jeffrey Denit M2802
Secretary Ann Andrews M2802..............382-5864

Office of Program Management and Support

WH-562 Director Jim O'Leary SE212
Secretary Brenda Chappell SE212...........382-4646

WH-565 Office of Policy, Planning and Information
Mike Gruber M2821.........................475-9391

Waste Management Division

WH-565 Director Joseph Carra (Acting)
Secretary Georgene Bolling M2811..........382-7917
WH-565 Deputy Director
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Secretary Georgene Bolling M2811.........382-7917
WH-565E Land Disposal Branch
Robert Tonetti Chief SE206C.............382-4654
WH-565A Waste Treatment Branch
Bob Dellinger Chief M2811...............382-7917
WH-565 Special Wastes Branch
Truett DeGeare Chief M2106..............382-3346

Characterization and Assessment Division

WH-562B Director Devereaux Barnes SE240
Secretary Brenda Marshall SE240.........382-4637
WH-562B Deputy Director
Matthew Straus SE240........................382-4637
WH-562B Technical Assessment Branch
Alec McBride SE206..........................382-4761
WH-562B Waste Characterization Branch
Robert Dellinger Chief SE242.................475-8551
WH-562B Land Disposal Restriction Branch
Steve Weil, Chief SE248...................382-4770

Permits and State Programs Division

WH-563 Director Bruce R. Weddle SE263
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WH-563 Deputy Director
Susan Bromm SE263.........................382-4746
WH-563 Permits Branch
Matt Hale, Chief SE264....................382-4740
WH-563 State Programs Branch
George Garland, Chief SE256...............382-2210
WH-563 Assistance Branch
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Office of Underground Storage Tanks

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Secretary Lisa Martin MLG-100...........382-7601
WH-562A Standards Branch
Jim McCormick Chief (Act.) MLG-100
Secretary Vacant MLG-100........382-7641
WH-562A Trust Fund Branch
Joe Retzer Chief MLG-100
Secretary Vacant MLG-100................382-7641

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Information Management Branch
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LE-134A Northern Branch
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LE-134S Eastern/Southern Regions Branch
Prentiss A. Allen, Chief..................382-3077
LE-134S Northern/Western Branch
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Kathy Summerlee, Chief....................382-2879
LE-134W Southern Regions Branch
John W. Lyon, Chief.......................475-8177

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Deputy Assistant Director
Martin J. Wright........................8-776-3215
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Region II Office
Joseph Cunningham........................8-264-8917
Region III Office
Robert Boodey..........................8-597-1860
Region IV Office
Bruce P. Mirkin..........................8-257-4885
Region V Office
Louis Halkias...........................8-886-9872
Region VI Office
Thomas Kohl............................8-729-9306
Region VII Office
Gregory T. Spalding......................8-758-3449
Region VIII Office
William F. Smith........................8-399-8306
Region IX Office
David Wilma............................8-454-0509
Region X Office
Dixon McClary..........................8-399-8306

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Secretary Jaqueline Brown W537...........475-8064
LE-130 Deputy General Counsel for Litigation
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C. Marshall Cain W537
Secretary Susan Butler W537..............475-8067
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(Vacant) W537B..........................475-8067
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Secretary Patricia Miller M3608..........475-8880
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LE-132G Grants, Contracts, and General Law Division
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Secretary Joyce Sanderlin W1029..........382-5320
LE-132I Inspector General Division
Craig B. Annear W1023
Secretary Glenda Colvin W1023.............475-6660
LE-132P Pesticides and Toxic Substances Division
Mark Greenwood W513
Secretary Arnita Moore W513..............382-7505
LE-132S Solid Waste and Emergency Response Division
Lisa K. Friedman W503
Secretary Shiela Sue Brown W503..........382-7706
LE-132W Water Division
Susan G. Lepow (Acting) W511
Secretary Jacqueline Hawkins W511.........382-7700

2. THE ENVIRONMENTAL PHOTOGRAPHIC INTERPRETATION CENTER (EPIC)

The Environmental Photographic Interpretation Center (EPIC) - affiliated with the Environmental Monitoring Systems Laboratory (EMSL) provides a variety of services in support of RCRA and Superfund programs.

2.1 EPIC SERVICES INCLUDE:

- Historical photographic analysis
- Current analysis and monitoring
- Topographic mapping
- Ordering photography or graphic displays for litigation support.

EPIC services can be useful for identifying solid waste management units, detecting contamination by identifying stressed vegetation, and confirming operational changes at a facility over time.

Details of the various services available through EPIC are provided in the sections below.

Historical Analysis

EPIC has conducted hundreds of historical analyses during the past several years. These frequent requests have led to development of a standard, bound-book report format containing annotated photo enlargements and explanatory text for each year of photography.

Ordering historical photography, depending on the source of the photography needed, can take several weeks or more before the photographs are available to EPIC analysts. The earlier a support request is made, the sooner the historical photos can be obtained and analyzed.

Historical reports are of two types, interim and final. The interim report is an unbound, draft copy of photos and environmental analysis, issued upon request, to enable Regional activity onsite to continue while awaiting the final report. The final form of the study is a bound, chronological account of site history including photography, maps, and text, assembled in formal presentation-quality format and put through EPIC quality assurance reviews.

Current Analysis

Some Regional activities do not need historical analysis, but can benefit from a current analysis. The term "current analysis" means either a new overflight is obtained for EPIC's use, or existing recent photography (since which no changes have occurred) is used in the study. The analysts' methods, and the final report format, are basically the same as those described above under historical analysis.

If a new overflight is needed, the EPIC Regional Desk Officer can assist in planning the best arrangement for a flight. Some of the factors to be taken into consideration are:

- Appropriate scale to provide the needed level of detail
- Seasonality if applicable
- Type of film which will best show the features of interest
- Camera systems appropriate for the coverage needed
- Cost estimates for different options.

Mapping/Photogrammetry

EPIC has access to a wide range of analytical equipment and procedures and can provide a number of photogrammetric services including the production of engineering-quality topographic and planimetric maps. High quality maps can also be produced from existing photography to trace historical developments and provide thematic overlays for various environmental considerations. Other photogrammetric measurements such as height, volume, area, and depth can be accomplished with a high degree of accuracy. Changes in these measurements can be traced over time to provide quantitative data to aid in both historical and current analyses.

Photography Orders

EPIC's in-house photography numbers in the tens of thousands of frames, including many flights not available elsewhere. EPIC also keeps on file the most recent National Cartographic Information Center photo coverage index, from which most of the commercially available photography anywhere in the country can be located. Lists of available photography requests are usually made in conjunction with an existing or upcoming request for photo analysis.

Graphic Displays for Litigation Support

EPIC's combination of photo analysis, darkroom, and technical graphics capabilities are frequently assigned to prepare poster-board-style photo enlargements. These are used in public meetings, interagency discussions, and as evidence in courtroom situations. Photo displays blown up as large as 4 by 8 have been prepared for Regional use.

Attached at the end of this section are three brochures describing in more details the types of services provided by EPIC.

2.2 HOW TO REQUEST EPIC SERVICES

To request the photographic interpretation service from EMSL/EPIC, the Region should prepare a Memorandum of Request for Support. Attached is a list of information that is needed in the Memorandum of Request for Support. One copy should be sent to Estelle Bulka in the Office of Waste Programs Enforcement at Headquarters and a second copy should be sent to the EMSL/EPIC contact for your particular Region. Regions I-IV should send a copy of their Memorandum of Request for Support to:

Gordon F. Howard
EPA/EPIC
P.O. Box 1587
Vint Hill Farm Station
Warrenton, VA 22186
(FTS) 557-3110

Regions V-X should send a copy of their Memorandum of Request for Support to:

Clayton E. Lake
EMSL/Las Vegas
P.O. Box 15027
Las Vegas, NV 89114
(FTS) 545-2100

Estelle Bulka will review and log the requests. After this initial screening to ensure that the request is appropriate under the scope of the funding and that sufficient funds are available to process the request, she will contact the EMSL/EPIC facility so that work can start. Estelle can be contacted at the address below:

Estelle Bulka
U.S. EPA
401 M St., SW (WH-527)
Washington, DC 20460
(FTS) 478-9324

It is important to submit your requests for EPIC services in support of RCRA enforcement/corrective action activities and any plans for anticipated future use of the EPIC aerial services as soon as possible. Please note that the average cost for EPIC services can range from $3,000 to $8,000 depending on the size of the site and the type of analysis requested and that it may take EPIC six months to prepare a final report.

Information Required in the Memorandum of Request for Support

- The Regional Contact/Project Officer's name, complete mailing address, and phone number.
- The name of the site or area of interest and its specific location; a photocopy of the site location and boundary on a 1:24,000 topographic map or other equally good map is requested. Giving location by coordinates only is prone to error and therefore not recommended.
- A brief description of the site, its history, and the environmental problems involved.
- Collateral information especially helpful in summarizing site characteristics (such as NPL listings, FIT team site maps, etc.).
- Objectives for the technical support being requested. Include in the description of needed assistance the following items:
  - The type of deliverable desired
  - The desired completion date
  - The historical time span of interest
  - Estimated number of copies needed
  - Whether interim or final reports or both are needed.

* Checklists: The brief checklists in the following pages need to be included with the request for support. The list titled "Hazardous Waste Site Analysis" accompanies all requests; the checklists for "Chemical Facility" and "Landfill Analysis" are included where appropriate.

I. _____ Photos Only (No Analysis)

_____ Current Photography

a. Scale: ______________

b. Time of Year: ________

c. Type of Photography Desired (Circle):

B&W	Color	Mapping or
Thermal	Color IR	Enviro-Pod

_____ Current Analysis

_____ Historical Analysis

a. Range of Coverage Needed: ______________

b. Specific Years Desired: ______________

II. SITE LOCATION

Geo. Coords: ______________

____

Name of Site: ______________

City/State: ______________

_____ Are Site Boundaries Delineated on a Quad Sheet?

III. DELIVERABLES

_____ Number of Final Copies Required

_____ Number of Interim Copies Required

Desired Completion Date: ______________

IV. Assigned Project Manager: ______________

Phone Number: FTS- ______________

V. TODAY'S DATE ______________

LANDFILL AND DUMP SITE ANALYSIS

The following elements are included in EPIC Specification 01 for the analysis of landfill and dump sites. Please check those elements that should be include in the current report:

_____ 1. Site size

_____ 2. Drainage pattern

_____ 3. Type of fill material (earth, construction waste, industrial waste, etc.)

_____ 4. Appearance of fill material (color, shade, texture, shape, etc.)

_____ 5. Leachate

_____ 6. Leachate lagoon

_____ 7. Evidence of salvage

_____ 8. Vegetation stress/damage

_____ 9. Fencing or other security

_____ 10. Equipment in use

_____ 11. On-site buildings and sheds

_____ 12. On-site activities (open burning, etc.)

_____ 13. Land Use within 2 kilometers of site boundary (USGS Level 2)

    _____ a. Critical environments within 2 kilometers (schools, recreation areas, dairy farms, orchards, wetlands, etc.)

_____ 14. Observable threats to ground water

_____ 15. Distance to nearest off-site surface water

_____ 16. Distance to nearest dwelling

_____ 17. Access route to site from major local highway

_____ 18. Observable obstacles to ground inspection parties (soft terrain, steep walls, eroded revetments, etc.)

_____ 19. Other

CHEMICAL FACILITY ANALYSIS
(MANUFACTURE, DISPOSAL, RECYCLING, STORAGE)

The following elements are included in EPIC Specification 01 for the analysis of chemical facilities. Please check those elements that should be included in the current report:

_____ 1. Site size

_____ 2. General condition of site

_____ 3. Number of tanks

    _____ a. Condition of tanks

    _____ b. Stains around tanks

    _____ c. Housekeeping practices around tanks

_____ 4. Number of drums

    _____ a. Condition of drums

    _____ b. Stains around drums

    _____ c. Housekeeping practices around drums

_____ 5. Buildings on site (sheds, bunkers, etc.)

_____ 6. Standing liquids

_____ 7. Containment

_____ 8. Drainage of site

    _____ a. Leakage from site

_____ 9. Waste burial areas within site (positive, probable, and possible)

_____ 10. Fencing or other security

_____ 11. Pipelines

_____ 12. Impoundments

    _____ a. Type (lined, earthen dam, etc.)

_____ 13. Vegetation stress/damage

_____ 14. Land use within 2 kilometers

    _____ a. Critical environments within 2 kilometers

_____ 15. On-site activities (open burning, etc.)

_____ 16. Observable threats to ground water

_____ 17. Distance to nearest off-site surface water

_____ 18. Distance to nearest dwelling

_____ 19. Access route to site from major local highway

_____ 20. Observable obstacles to ground inspection parties

_____ 21. Other

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P.O. Box 15027
Las Vegas NV 89114-5027

September 1981

EPA

Using Aerial Photography for Locating and Investigating Hazardous Waste Sites

Hazardous wastes have been deposited in pits, ponds, lagoons, landfills, and fields throughout the nation, and particularly in and around industrialized urban areas. Many of these disposal sites are readily identifiable. Others have been covered and abandoned or converted to other uses.

The EPA's Environmental Monitoring Systems Laboratory in Las Vegas is taking part in an Agency-wide effort to identify hazardous waste sites and to investigate those with the highest potential for release of hazardous materials into the environment. One of the Laboratory's more important activities is the acquisition and analysis of aerial imagery to locate and describe potentially hazardous sites.

As indicated in Figure 1, during the Fiscal Year 1981 the Laboratory carried out more than 100 investigations. Some projects have involved a large number of sites within sizeable geographical areas (e.g., Niagara County, New York; Salt Lake City, Utah; Memphis, Tennessee). Other projects have focused on individual sites or clusters of several sites.

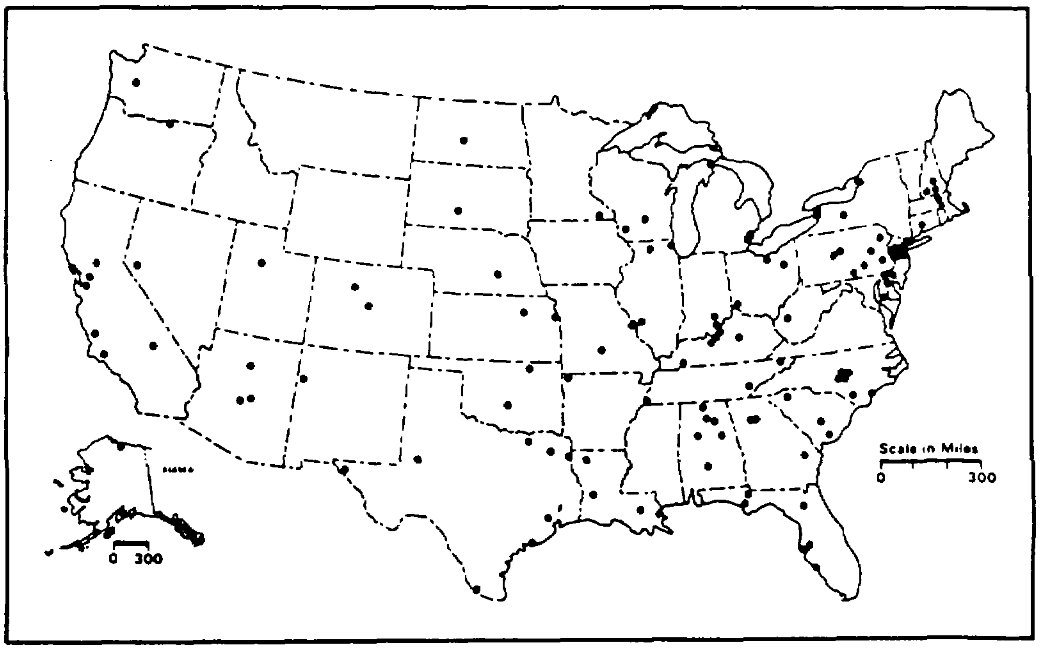


Figure 1. Locations of hazardous waste site investigations.

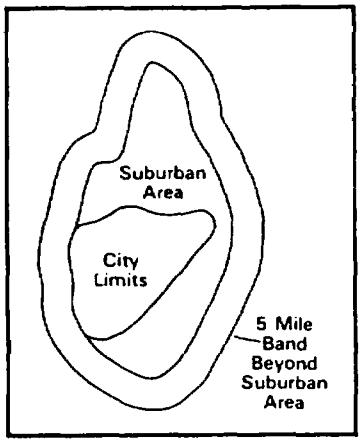


Figure 2. Metropolitan area coverage by aerial photography.

Laboratory priorities in investigating waste sites are generally determined by EPA's Program Offices in Washington and Regional Offices throughout the country. Aerial photography is used by these offices to supplement information obtained from other sources and to help target on-site investigations. The Laboratory's field station in Warrenton, Virginia, the Environmental Photographic Interpretation Center, responds to requests for support from the Program and Regional Offices in the eastern states (EPA Regions I-IV), while the Advanced Monitoring Systems Division in Las Vegas responds in the central and western states (EPA Regions V-X).

Some metropolitan areas have disposal sites widely distributed throughout the areas. One approach being explored by the Laboratory is the systematic screening of a metropolitan area, followed by detailed investigations of the sites of greatest concern. As shown in Figure 2, the initial screening would extend beyond the built-up areas.

Figure 3 exemplifies how aerial photography is used to portray possible problem sites in a metropolitan area—in this case, a portion of Memphis, Tennessee. The sites of interest are classified into categories such as liquid waste disposal sites, active landfills, junkyards, and unidentifiable scars. Descriptions are prepared for each site. The cost of an initial scanning of an entire metropolitan area ranges from about $15,000 to $50,000 depending on the size and complexity of the urban area.

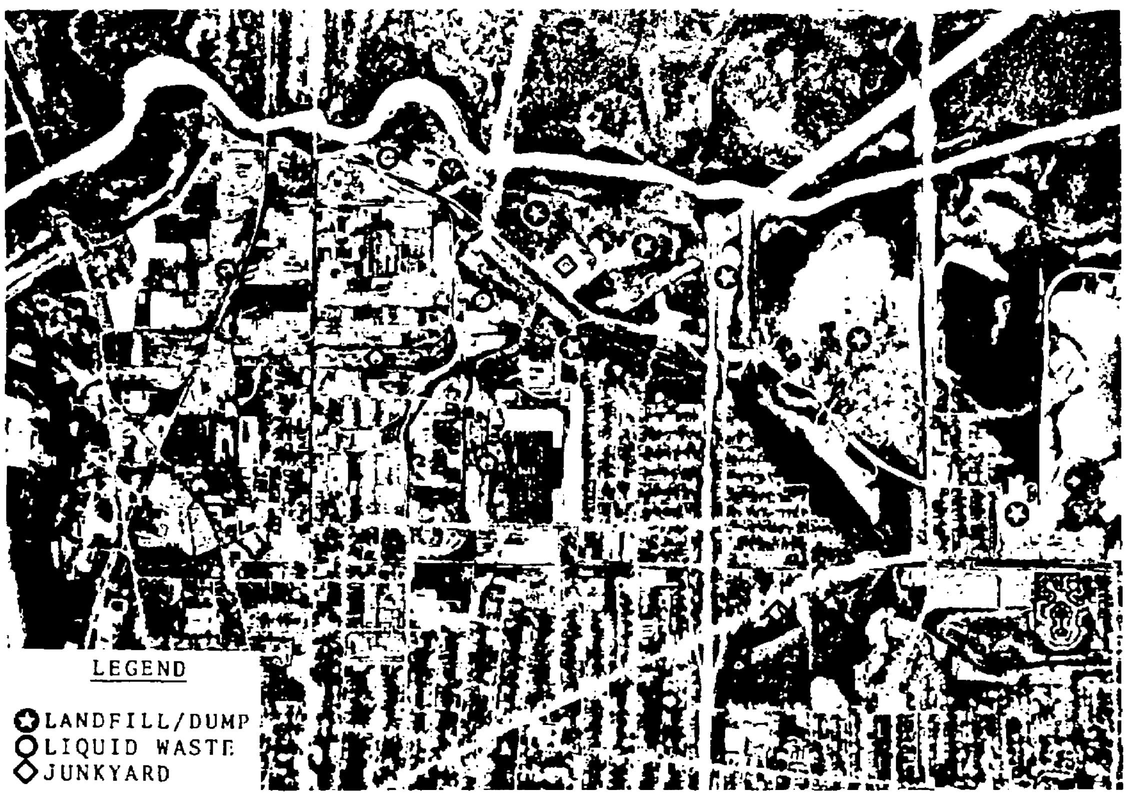


Figure 3. Initial scan of metropolitan area to locate possible hazardous waste sites.

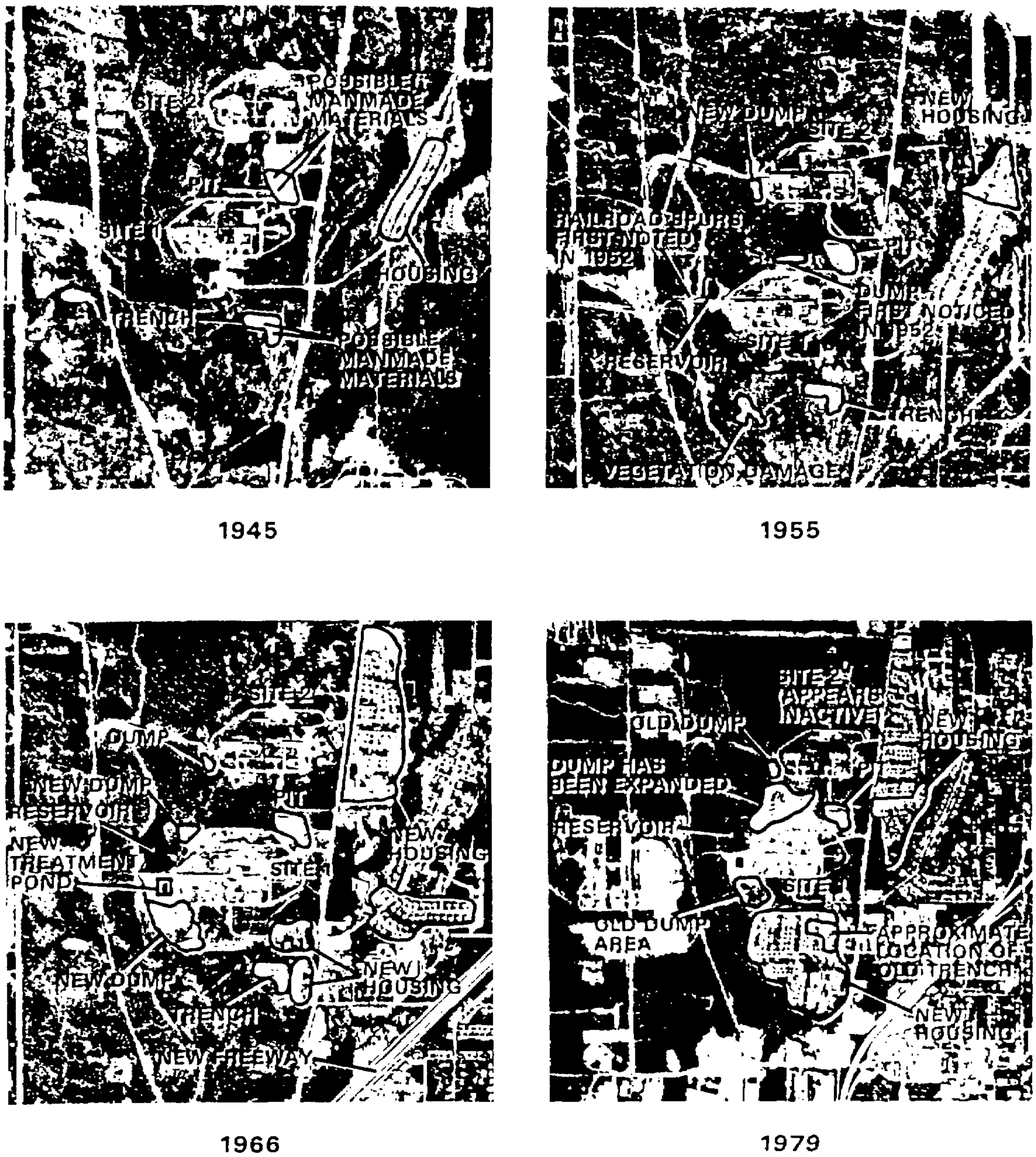


Figure 4. Overhead imagery used to trace the history of one site.

Historical (archival) photographs, which may date back forty years or more, play an important role in the general survey of the city and in investigating specific sites. As shown in Figure 4, historical photographs can remove the "disguise" of current land use and uncover environmental problems.

Archival imagery is obtained from the National Archives, the data center of the U.S. Geological Survey, and other sources such as city, county, and state agencies. Usually imagery taken at three or more dates from the late 1930's to the present is examined. If necessary, current photography is obtained from overflights.

Analysts use stereo pair photos which provide three-dimensional views for scrutiny of areas of concern. Also, collateral information from available records and from previous studies is used whenever possible.

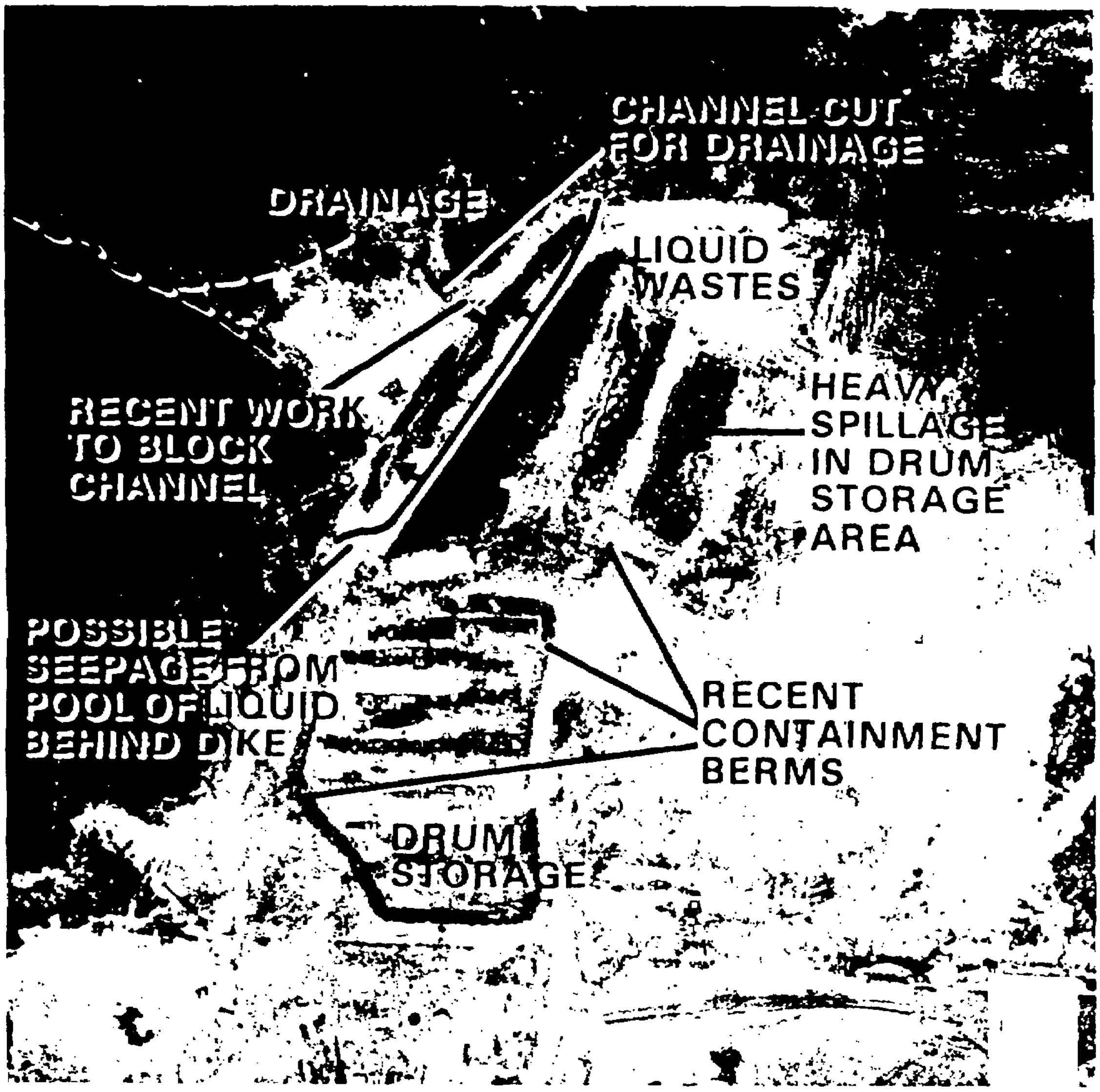


Figure 5. Typical end product of a site investigation.

During the intensive investigation phase, up-to-date imagery is obtained. History of the land use around a site and drainage patterns are carefully studied. Of special concern are the locations of nearby residences and direct and indirect environmental pathways to these residences. Frequently, detailed imagery analysis is coupled with ground investigations to provide a more complete picture of potential environmental problems. Figure 5 shows an end product resulting from a detailed analysis.

Thus, aerial photography provides an authoritative and relatively inexpensive tool for clarifying and documenting a large number of environmental problems associated with disposal of hazardous wastes.

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P.O. Box 15027
Las Vegas, NV 89114

December 1982

EPA

Aerial Photography for Emergency Response

Transportation and pipeline accidents and careless handling and disposal practices that cause chemical fires and spills of hazardous substances into the environment are a continuing problem throughout the nation. The EPA's Environmental Monitoring Systems Laboratory, with facilities in Las Vegas and in Warrenton, Virginia, assists in the Agency's efforts to contain or clean up these emergency conditions by providing aerial photography services around the clock to EPA response teams.

Emergency responses must be tailored to the specific needs of each incident, and aerial photographs can provide a quick overview of the existing situation. Support provided by the Laboratory, using commercial flying services available nationwide and processing facilities at the Laboratory's two locations, includes immediate acquisition, processing, and analysis of aerial photographs; telephone relay of critical information to the on-scene response teams; and prompt preparations of annotated photographs and maps for the on-scene teams.

Analysis of aerial photographs provides information on conditions at the site such as the location and extent of visible spillage, vegetation damage and potential transport of chemicals via drainage conduits. Annotated overlays for the photographs can show this information in relation to nearby locations threatened by the emergency, and they can aid in planning of cleanup or hazard mitigation efforts. Follow-up aerial photographs taken after the initial emergency response can be used to judge the effectiveness of cleanup operations and the amount of damage to the environment.

Specialists at the Laboratory have recently responded to several types of emergencies involving hazardous materials.

On July 11, 1981, a fire and a series of subsequent explosions in the Los Angeles area engulfed a drum storage facility containing approximately 18,000 drums of hazardous wastes. The site is located next to a flood control channel leading to the Pacific Ocean 20 kilometers away. Figure 1 is an aerial photograph taken on July 13, 1981, after the fire was extinguished. Analysis of the photograph showed that the fire had affected about one-third of the drums stored at the site. Drums stacked at the north and south ends of the site were not involved. Over a hundred drums are visible outside the fence along the site's western edge and immediately adjacent to the edge of the flood control channel. Stains on the side of the channel were caused by contaminated water runoff from the site during efforts to extinquish the fire. This contaminated water was discharged into the ocean, raising ecological concerns.

A subsequent study of historical photographs covering the previous 50 years traced the development of the site and it's surrounding area. No evidence of drum burial at the site appeared in the historical photographs. The photograph in Figure 2, taken a few days before the fire, shows residential areas and an oil refinery in the vicinity of the storage fascility. A photograph taken in 1982 after the incident showed the cleaned up site with no drums present.

Figures 3 and 4 show an oil spill caused by a ruptured oil pipeline in northern Wyoming in August 1982. Several thousand barrels of oil entered a nearby creek and then flowed into the connecting river and a reservoir. Aerial photographs taken over the next few

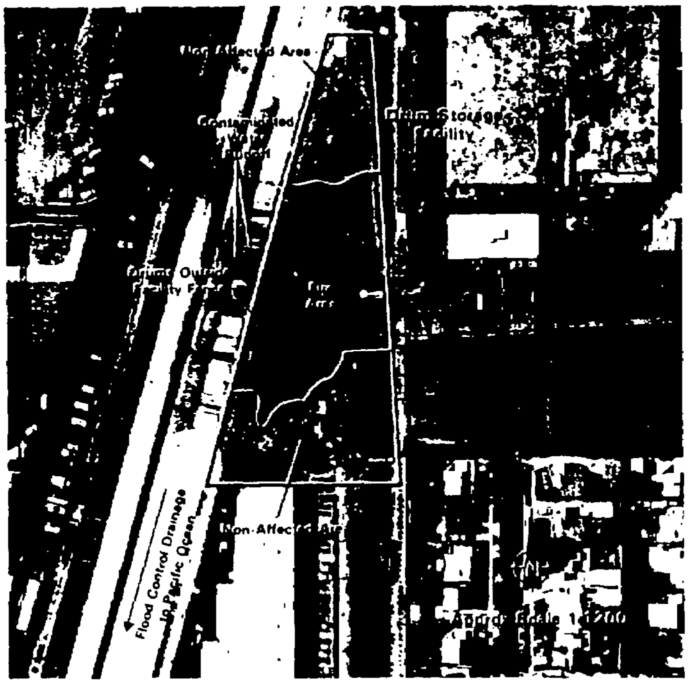


Figure 1. Drum storage site two days after the fire erupted.

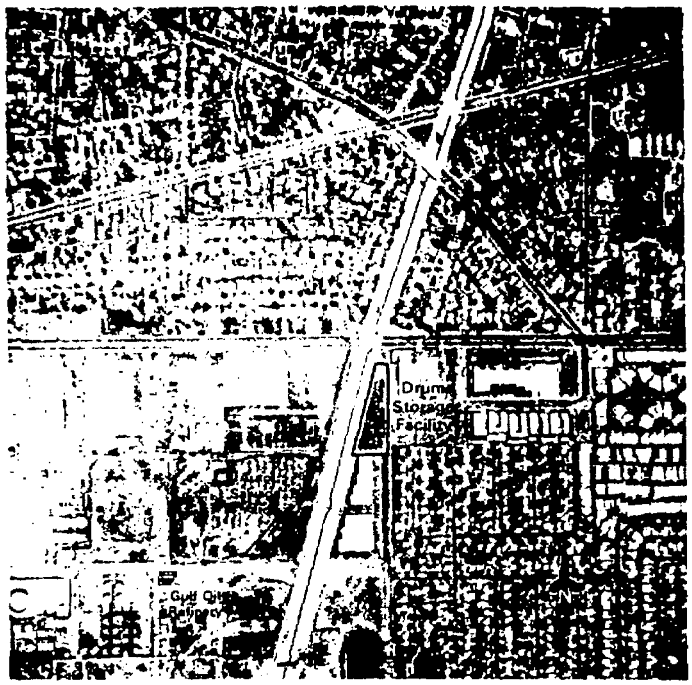


Figure 2. Drum storage site before fire showing its location relative to the flood control channel and residential and industrial areas.

days followed the path of the oil spill movement. The photographs guided the on-scene coordinator in selecting locations for containment booms and pin-pointing areas of oil accumulation. Subsequent photographs verified the adequacy of the containment and cleanup of the spill.

A third kind of emergency occurred in late September 1982 when 43 of 101 cars of a freight train derailed near Livingston, Louisiana. Many of these were tank cars carrying explosives and toxic chemicals that caused an intense fire and several explosions. The

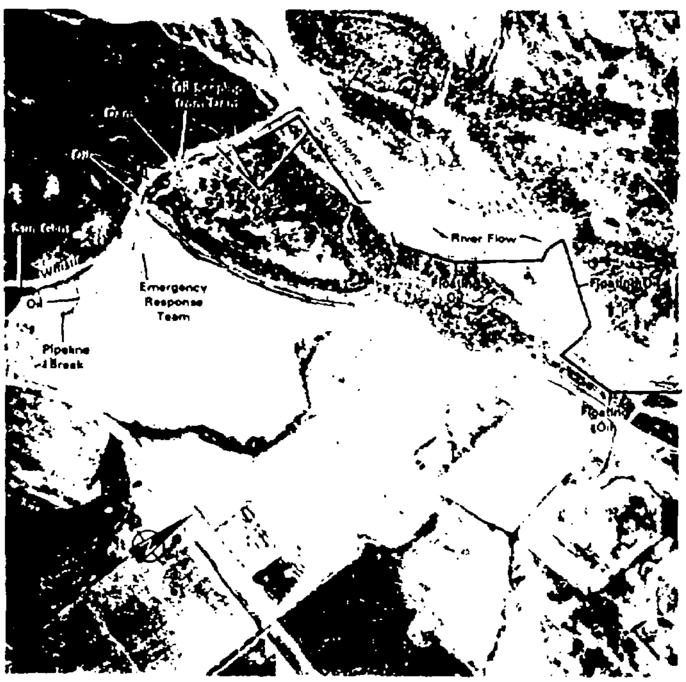


Figure 3. Oil from ruptured pipeline flows into nearby creek.

Figure 4. Oil flows into reservoir about 25 miles from ruptured pipeline.

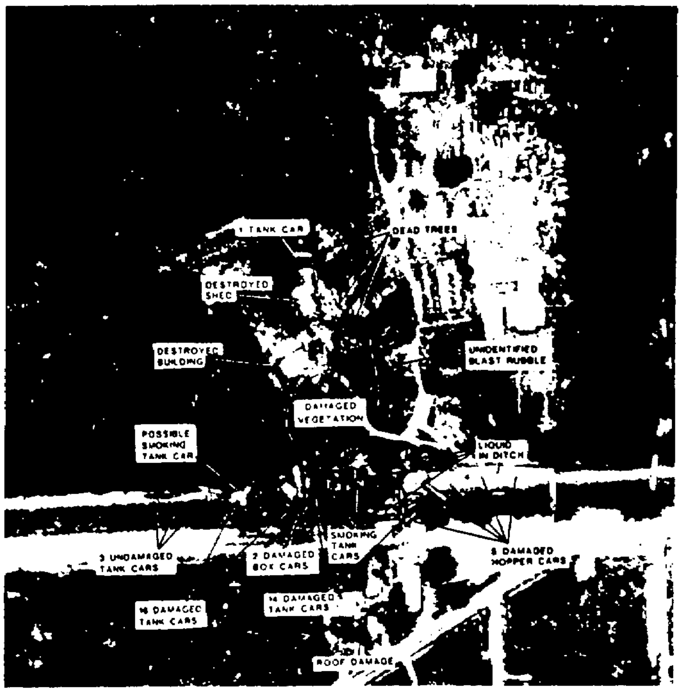


Figure 5. Damage to area surrounding the train wreck from fire and explosions.

Figure 6. Closeup view of wreck helps identify particular cars and exact location of fires.

variety of chemicals carried in the tank cars made firefighting difficult. Aerial photographs shown in Figures 5 and 6 helped to pinpoint particular cars, the exact location of fires, accumulation of hazardous materials, and the extent of damage and contamination to the surrounding area. These aerial photographs also provided valuable information for safety planning, including population evacuation and reoccupancy and determination of a control area.

United States
Environmental Protection
Agency

Environmental Monitoring
Systems Laboratory
P.O. Box 15027
Las Vegas NV 89114

October 1982

EPA

Aerial Photography to Support Chemical Exposure Assessments

The use of aerial photography to support environmental assessments has increased dramatically in recent years. At the same time Federal and State agencies have focused their attention on the public's exposure to toxic chemicals that escape into urban areas during manufacturing activities, from storage or waste sites, or from transportation accidents. The EPA's Environmental Monitoring Systems Laboratory in Las Vegas has played a central role in applying photo-interpretation techniques to assess the adverse environmental effects of many of man's activities.

Aerial photography has been used in studies on the environmental impact of industrial facilities, coal extraction, septic tank failures, hazardous waste sites, and wetlands development. For example, during fiscal year 1982 Laboratory scientists supported environmental assessments of more than 200 hazardous waste sites. EPA scientists are also using aerial photography to improve approaches to monitoring air, water, soil, food, and other environmental pathways in order to assess the degree and extent of chemical exposures to man.

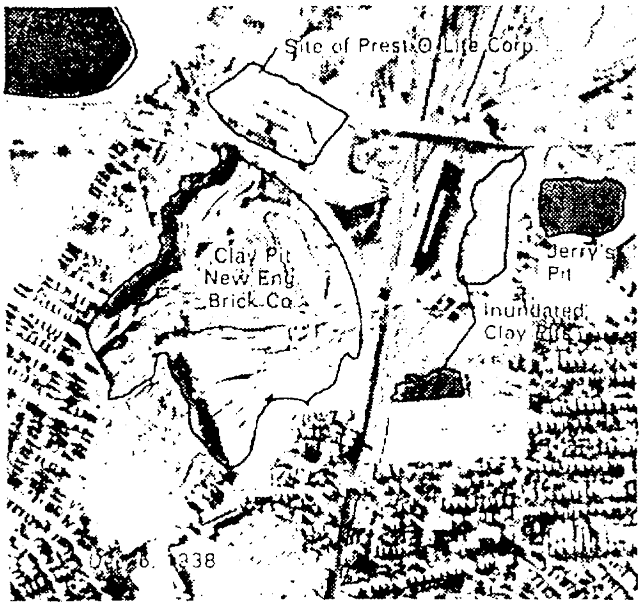
Innovative uses of photo-interpretation techniques are being explored to support studies of human exposures to toxic chemicals. Earlier projects using aerial photography have been directed to such problems as pollutant leakage into waterways or aquifers used for drinking water supplies, and the proximity of populations to chemical spills and explosions. However, only recently have serious efforts been made to link aerial photography capabilities in a systematic manner with the design of exposure monitoring networks.

Identifying Chemical Sources and Potential "Hot-Spots"

Aerial photography, when used in conjunction with collateral data such as information from EPA industrial waste discharge permits, can be very useful in pinpointing possible sources of the environmental chemicals of concern. Factories, smokestacks, waste discharges, dumps, and vehicles can all be located and counted. The resulting inventories of emission sources provide basic data for choosing appropriate monitoring methods and sites.

Both operating and abandoned facilities can often be recognized in photographs taken over a period of many years. Abandoned facilities are of particular concern because they are commonly forgotten, restructured or lost, and may be unsuspected and potent sources of pollution. Their location and identification through use of historical aerial photography can aid in the design of a monitoring network.

Finding the location and fixing the size of "hot-spots"--areas of high chemical concentration--present problems since most chemicals aren't visible. Aerial photographs show possible routes of chemical migration away from a source, such as swales or drainage channels, to low points where chemicals may accumulate. By reference to interpreted aerial photographs, investigation or monitoring teams can sample soil or other media from the places most apt to be confirmed as hot spots and thus reduce the costs of the monitoring program. Box 1 shows industrial facilities present in 1938 that are so changed by 1978 that former pits and plant sites would not be easily recognized as potential hot spots.



The 1938 photo shows a large clay pit used by a brick manufacturer, several other inundated clay pits, and the site of a battery manufacturing company. In 1952 the city took over the brick company's pit for use as a city dump. By 1978 housing units had been built on part of the area; the inundated clay pits to the right in the 1938 photo have been filled and an apartment complex built on the lower site and high rise apartment buildings on the upper site; and the site of the battery factory holds a shopping center.

Recommended Sampling Points

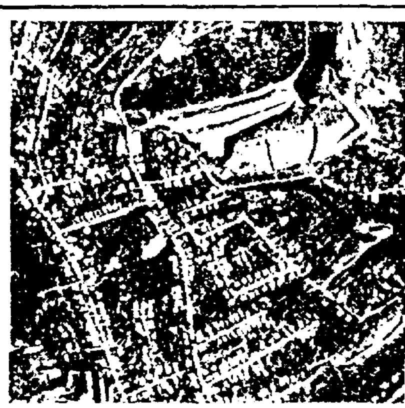
- → *Drainage in 1938*
- ⊙ *Lowest points in clay pits in 1938*
- ● *Liquid filled clay pits in 1938*
- ▲ *Drainage point of large, liquid-filled pit in 1938*

Box 1

Characterizing Population Distribution Patterns

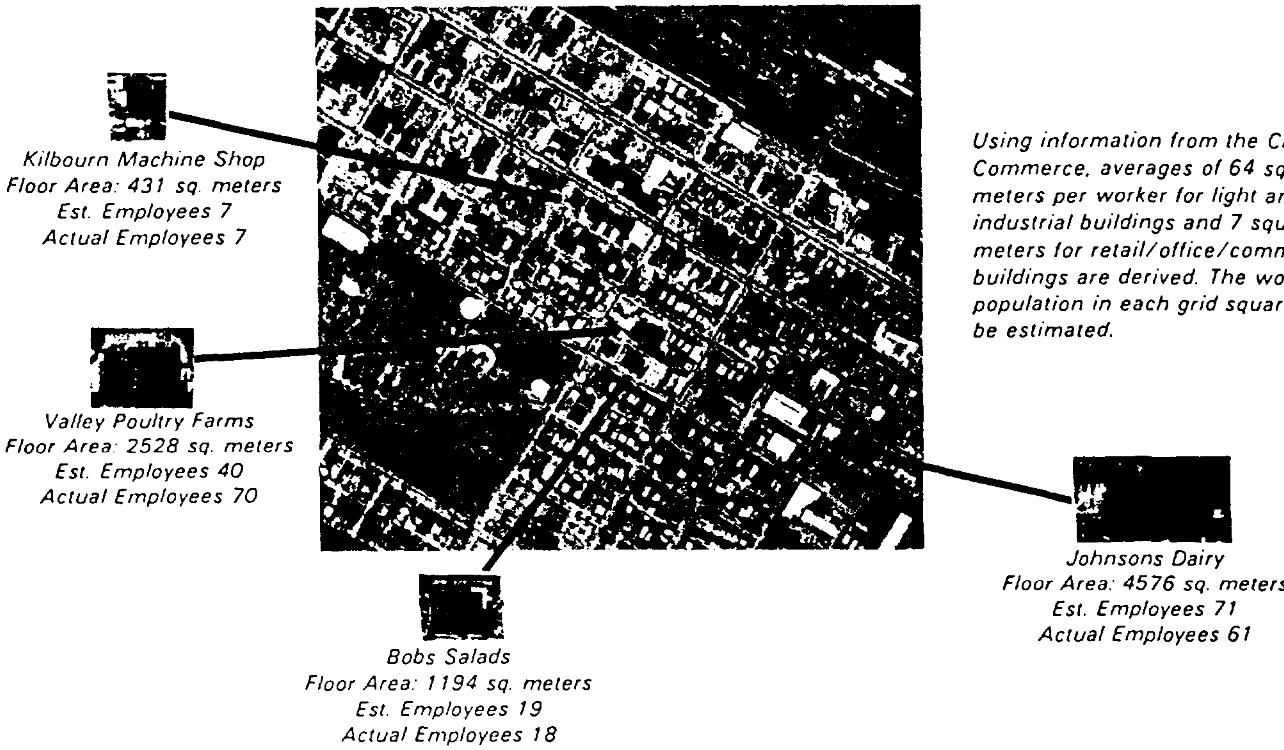
Monitoring systems to support exposure assessments should be able to characterize the level and extent of chemical contamination in different environmental media. Also, the design of these systems should facilitate relating the contamination to the location of people in the impacted area. Aerial photography is a powerful tool in determining population densities in specific geographical locations during the day and night and thereby guides the location of monitoring sites

Specifically, aerial photography provides a means for subdividing census tract information into smaller geographical subunits more useful for designing exposure monitoring networks. For example, housing counts can provide residential population estimates, as shown in Box 2, while commercial building counts can be used to estimate labor force populations, as shown in Box 3. These estimates help to determine population densities for specific areas and times of day.



Census tract information indicates that in thes two grids (a standard grid is one square kilometer) an average of 2.7 persons occupy each dwelling with a split of 48% male and 52% female. Building counts provide an estimate of populations of 5 males and 6 females in the grid to the left and 972 males and 1,053 females in the grid to the right.

Box 2



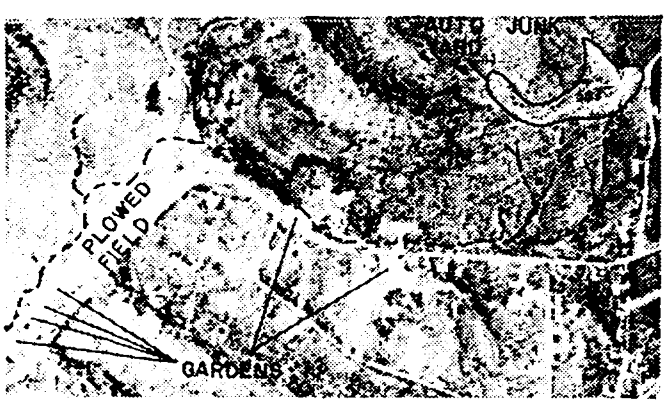
Using information from the Chamber of Commerce, averages of 64 square meters per worker for light and heavy industrial buildings and 7 square meters for retail/office/commercial buildings are derived. The worker population in each grid square can then be estimated.

Box 3

Aerial photography can also be used to pinpoint areas with populations of special concern such as high density apartment complexes as contrasted to sprawling residential areas; business district shopping malls as distinct from office buildings and rural malls; or industrial areas that are open to the environment as distinct from those that are enclosed. Also, schools, playgrounds, and hospitals can be located. Again, these distinctions help to determine the locations of monitoring sites.

Locating Locally Grown Food

Possible contamination of food supplies is a major concern in exposure assessments. Aerial photography can be very effective in locating agricultural plots in the geographical areas under study. For example, in connection with the nuclear power plant accident at Three Mile Island, all dairies in the area were rapidly catologed with the aid of aerial photographs. Current emphasis is on techniques for locating and categorizing small garden plots, and particularly plots located downwind from air emissions or along drainage routes from hazardous waste sites. Box 4 shows how agricultural plots can be identified and impacted by possible contamination problems. Box 5 shows the distribution of home gardens in an industrialized area of southeast Ohio.



An auto junkyard can be seen on the ridge top near the upper right corner of the photograph. Drainage channels lead from the junkyard into the stream below. The stream then flows past several gardens and small agricultural plots. Pollutants (oil, cadmium and chromium compounds, battery acid, etc.) may leach from the junkyard into the stream and eventually be deposited in the garden plots along the stream.

Box 4

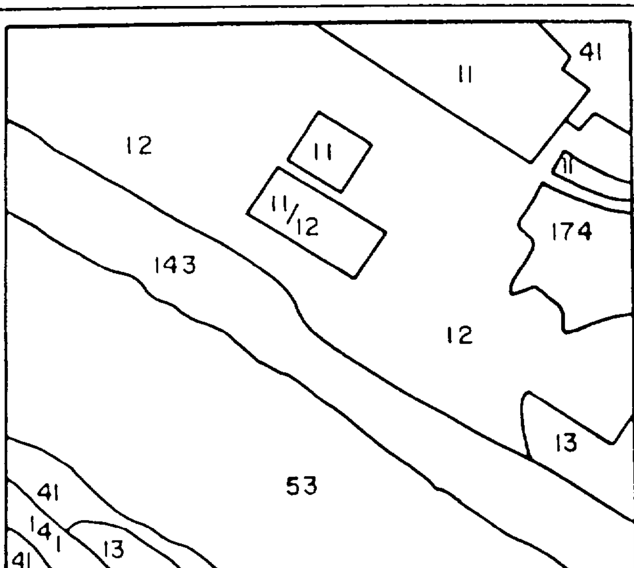
Home garden plots in an industrialized area. Further research is needed to determine the feasibility of distinguishing among selected categories of produce and of relating locally-grown produce to dietary habits of local populations.

Box 5

Characterizing Terrain Roughness

Because of the complexity of changing meteorological conditions, mathematical models of the air flow over an area are essential to determine the patterns of ambient pollution concentrations to which people are exposed. These models can provide the basis for determining the best location for air sampling stations.

An important input for such models is information that characterizes the roughness of the terrain over which air pollutants flow. This roughness is not only the natural contour of the earth, but includes manmade structures that extend upward from the surface of the earth into the normal air flow. Land use categories, determined from interpretation of aerial photographs, can be related to roughness given the characteristics of the specific geographical area (e.g., topography, height of forests, and height and density of buildings). Box 6 illustrates how an area is classified by land use categories.



11 - Residential
12 - Commercial/retail
13 - Industrial site and facilities
11/12 - Mixed residential/commercial
41 - Deciduous forest
53 - A river partially controlled by manmade structures
141 - Highways and public roads including rights-of-way
143 - Railroad yards and associated facilities
174 - Urban vacant

The diagram to the left indicates the land uses found in the photo above of Ashland, Kentucky. The land use classifications are derived from a publication of the United States Geological Survey. Examples of average structure heights might be:
Category 11 - 31 feet
Category 12 - 44 feet
Category 13 - 46 feet.

Box 6

3. ENVIRONMENTAL RESPONSE TEAM (ERT)

The Environmental Response team (ERT), as part of the Hazardous Response Support Division, under OSWER, is a multidisciplinary group of hazardous waste experts who provide assistance to other EPA professionals involved in hazardous waste sites. The ERT is designed primarily to assist On-scene Coordinators and Regional Response Teams in dealing with environmental issues associated with the clean-up of oil spills in navigable waters, and accidents involving hazardous substances. ERT members have expertise in a wide range of areas including:

- Biology
- Chemistry and Chemical Engineering
- Civil and Sanitary Engineering
- Environmental Health and Science
- Industrial Hygiene.

Specific functions that team members are trained to perform, and which may be relevant to RCRA inspectors involved in case development include:

- Chemical, physical and biological treatment
- Monitoring techniques
- Installation, operation, and evaluation of instrumentation
- Sampling and analysis of air, water and soil
- Water pollution biology and toxicology
- Computerized gas chromatography/mass spectrometry

RCRA inspectors can approach ERT members for critical consultation in water and air quality issues, toxicology, interpretation and evaluation of analytical data, and scientific and engineering studies.

Two examples of the types of assistance that are provided by ERT are provided below.

1. ERT has provided assistance to the U.S. Attorney's Office, State Health and Environmental Departments at a hazardous waste disposal facility. The ERT was not only instrumental in conducting an on-site air monitoring program and safety protocol evaluation, but also was the primary developer/implementor of the long term air monitoring program. In addition, ERT assisted with the planning and review of the responsible party's risk assessment for various remedial options. Because of ERT's involvement in the Site Assessment, Air Monitoring and Safety protocols, ERT was requested to serve as the technical focal point for similar assistance at a different site involving the same responsible party.

2. ERT's assistance was requested in the removal clean-up activity of a recycling facility involving hazardous substances. The Team assisted the OSC in developing and implementing: 1) a site safety plan; 2) On-site mobile laboratory capabilities for heavy metals, PCBs, and other organic materials: 3) a field compatibility test and computerization of all data which expedited bulking/shipping the waste from the site; 4) a site specific air monitoring program and an overall air monitoring program for hazardous waste sites and; 5) the containment/treatment operations.

Details on specific assistance may be obtained through:

Environmental Response Team
U.S. Environmental Protection Agency
Edison, NJ 08837
(201) 321-6740
FTS 340-6740

4. OFFICE OF RESEARCH AND DEVELOPMENT (ORD) HAZARDOUS WASTE ENGINEERING RESEARCH LABORATORY (HWERL).

The Hazardous Waste Engineering Research Laboratory is responsible for the implementation of engineering research and development related to solid and hazardous wastes and hazardous substances, within the Office of Research and Development. The mission of HWERL is to provide authoritative, defensible engineering basis in support of the policies, programs and regulations of the Environmental Protection Agency, (with respect to solid and hazardous waste and Superfund activities). As part of this mission the Laboratory undertakes the following functions:

- Defines and characterizes sources of pollution
- Catalyses advances in state-of-the-art pollution control
- Provides engineering concepts for cost effective engineering solutions to difficult pollution problems
- Provides early warning to emerging sources of pollution.

Inspectors involved in case development may want to consult with experts at HWERL when evaluating the technical aspects of their cases, interpreting information provided by the owners and operators, and assisting in drafting technical requirements for compliance orders.

Requests for technical assistance should be directed to Mr. Eugene Harris at (513) 569-7862.

Attached is a copy of the HWERL Technical Assistance directory. This directory includes contacts and telephone numbers for various technical areas.

TECHNICAL ASSISTANCE DIRECTORY

Land Pollution Control Division

Research Program .... Hill/Schomaker/Wilder

Technical Assistance Coordination .... Harris

Superfund Innovative Technology Evaluation (SITE) .... Hill/James

Alternative Technologies Division

Research Programs and Facilities .... Dial

Thermal Destruction Branch .... Oppelt

Chemical and Biological Detoxification Branch .... Klee

Laboratory Quality Assurance/Quality Control .... Simes

Technical Information Exchange .... Simes

Case Histories/Computerized File .... Masters/Griffiths

A. RCRA Facilities .... Schomaker

1. Landfill Design and Operation .... Landreth
2. Waste Leaching .... Roulier
3. Pollutant Migration .... Roulier
4. Pollutant Control .... Landreth/Curran
5. Flexible Membrane Liners .... Landreth
6. Soil Liners .... Grube/Roulier/Dotson
7. Surface Impoundments .... Wiles
8. Stabilization Processes .... Wiles/Mashni
9. Volatile Emissions .... dePercin
10. Municipal Solid Waste .... Landreth/Schomaker/Wiles
11. Underground Mines ....Wiles
12. Compatibility Testing .... Landreth/Grube
    a. Clay Liners and Slurry Backfills .... Grube/Roulier
    b. Flexible Membrane Liners .... Curran/Landreth
    c. Grouts .... Grube
13. Construction Quality Assurance/Quality Control .... Herrmann
14. Hydraulic Conductivity .... Grube
15. Surface Impoundment Closure .... Wiles
16. Mining Sites .... Hill/Harris
17. Oil Shale .... Bates

TECHNICAL ASSISTANCE DIRECTORY (Continued)

B. Expert Systems .... Greethouse/Ammon

C. Leaking Underground Storage Tank Research
(LUST) .... Field/Farlow/Tarfuri

D. Analytical Services

1. Analytical Chemistry .... Warner/Gruenfeld/Frank/Krishnamurthy
2. Mobile Analytical Laboratories .... Gruenfeld/Frank
3. Statistical Design/Analysis .... Greathouse

E. Thermal Destruction of Hazardous Materials

1. Conventional and "At Sea" Incineration .... Oberacker
2. Disposal of Hazardous Waste in Kilns .... Mournighan
3. Non-Flame Thermal Destruction .... Malanchuk/Wall
4. Disposal of Hazardous Waste in Boilers .... Oberacker/Licis
5. Innovative Technologies .... Freeman/Lee
6. Engineering Analysis of Thermal Destruction Processes .... Lee
7. Pilot Scale Combustors .... Staley/Garcia
8. Thermal Destruction Data Base .... Lee

F. Nonthermal Hazardous Waste Treatment

1. Air Emissions from Treatment, Storage
and Disposal Facilities .... Blaney/dePercin/Westfall
2. Biological Treatment of Soils and Sediments .... Sferra/Glaser
3. Emerging Technologies for Biological
Detoxification of Hazardous Waste .... Sferra/Glaser
4. Characterization and Management
of Treatment Process Residuals .... Warner/Grosse
5. Demonstration of Alternative
Hazardous Waste Treatment Technologies .... Freeman/Olexsey
6. Emerging Technologies for Chemical
Detoxification of Hazardous Waste .... Rogers/Kornel/Wilson
7. Established Technologies for
Inorganic Wastes .... Grosse/Warner/Thurnau/Turner/Westfall

TECHNICAL ASSISTANCE DIRECTORY (Continued)

8. Established Technologies for Organic Wastes .... Turner/Westfall

9. Hazardous Waste Treatment Process Sampling and Analysis .... Thurnau/Warner

10. Hazardous Waste Minimization, Reuse, Recycle .... Freeman/Olexsey

11. Metals .... Howell/Bates/Durham/Martin

12. Pesticides .... Rogers

13. Physical/Chemical Separation and Concentration of Hazardous Wastes .... Howell/Martin/Wilson

14. Physical/Chemical Treatment of Soils and Sediments .... Rogers/Kornel

15. Pilot Scale Treatability Studies .... Grosse/Olexsey

16. Technology Assessments of Established Hazardous Waste Treatment Technologies .... Turner/Olexsey

Superfund

A. Superfund Innovative Technology Evaluation (SITE)

1. Administration/Technical Evaluations .... Hill/James
2. Technical Evaluations .... Freestone/Stinsor
3. Administration .... Frietsch
4. Thermal Processes .... Lee/Staley
5. Physical/Chemical Treatment .... Rogers/Thumau/Westfall

B. Containment Technology .... Scanning

1. Barriers (Slurry Walls) .... Grube
2. Covers .... Houthoofd/Hartley
3. Plume Management .... Barkley/Ammon
4. Bottom Sealing .... Grube
5. Waste Storage .... Houthoofd/Wiles
6. Mine Storage .... Houthoofd/Wiles
7. Encapsulation/Overpacking .... Wiles
8. Stabilization/Fixation .... Wiels/Houthoofd
9. Leachate Control and Treatment .... Opatken

TECHNICAL ASSISTANCE DIRECTORY (Continued)

10. Permeable Treatment .... Herrmann
11. Fugitive Dust Control .... dePercin
12. Freezer Technology .... Houthoofd
13. Impoundments/Waste Lagoons .... Tafuri/Wiles
14. Floating Spills .... Griffiths/Farlow

C. In-Situ Treatment .... Hill/Sanning/Farlow

1. Flushing .... Traver
2. Freezing .... Houthoofd
3. Electrokinetic .... Herrmann
4. Vegetative .... Sferra/Barkley/Grube
5. Grouting .... Barkley
6. Thermoplastics .... Opatken
7. Precipitation .... Tarfuri/Farlow/Opatken
8. Thermal Fusion (Vitrification) .... Sanning
9. Sorption .... Royer/Brugger/Roulier
10. Ion Exchange .... Tafuri/Traver/Opatken
11. Chemical .... Rogers/Tafuri
12. Biodegradation .... Sferra/Lewis/Brugger
13. Photochemical .... Rogers
14. Delivery and Recovery Methods .... Traver

D. On-Site Technology .... Freestone

1. Incineration Technology (Mobile) .... Freestone/Brugger/Yezzi
2. Incineration Technology (Fixed) .... Mournighan/Oberacker
3. EPA Developed On-Site Treatment/Control Technologies (Mobile Soil Washer, Mobile Carbon Regenerator) .... Brugger/Traver
4. Commercially Developed On-Site Treatment Technologies .... Stinson/Freestone
5. Mobile In-Situ Containment/Treatment System .... Traver

TECHNICAL ASSISTANCE DIRECTORY (Continued)

E. Personnel Protection .... Royer/Gruenfeld

1. Protective Clothing and Equipment .... Royer
2. Underwater Protective Clothing .... Traver
3. Decontamination/Contamination Avoidance Procedures ... Royer/Stinson
4. Personal Hazard Detectors .... Royer

F. Expert Systems .... Greathouse/Ammon

G. Remedial Action Costs .... Goddard/Ammon

H. Building and Equipment Decontamination .... Barkley/Westfall

I. Remedial Investigaiton/Feasibility Study Process .... Ammon

J. Canine Olfaction .... Masters/Wilder

Pilot and Testing Facilities

A. Analytical Services Laboratory (Cincinnati, OH) .... Warner

B. Center Hill Facility (Cincinnati, OH) .... Huffman/Burkart

C. Combustion Research Facility (Jefferson, AR) .... Mournighan

D. Environmental Emergency Response Unit (Edison, NJ) .... Wilder/Yezzi

E. Oil and Hazardous Materials Simulated Environmental
Test Tank (Edison, NJ) .... Griffiths/Farlow

F. Test and Evaluation Facility (Cincinnati, OH) .... Liberick

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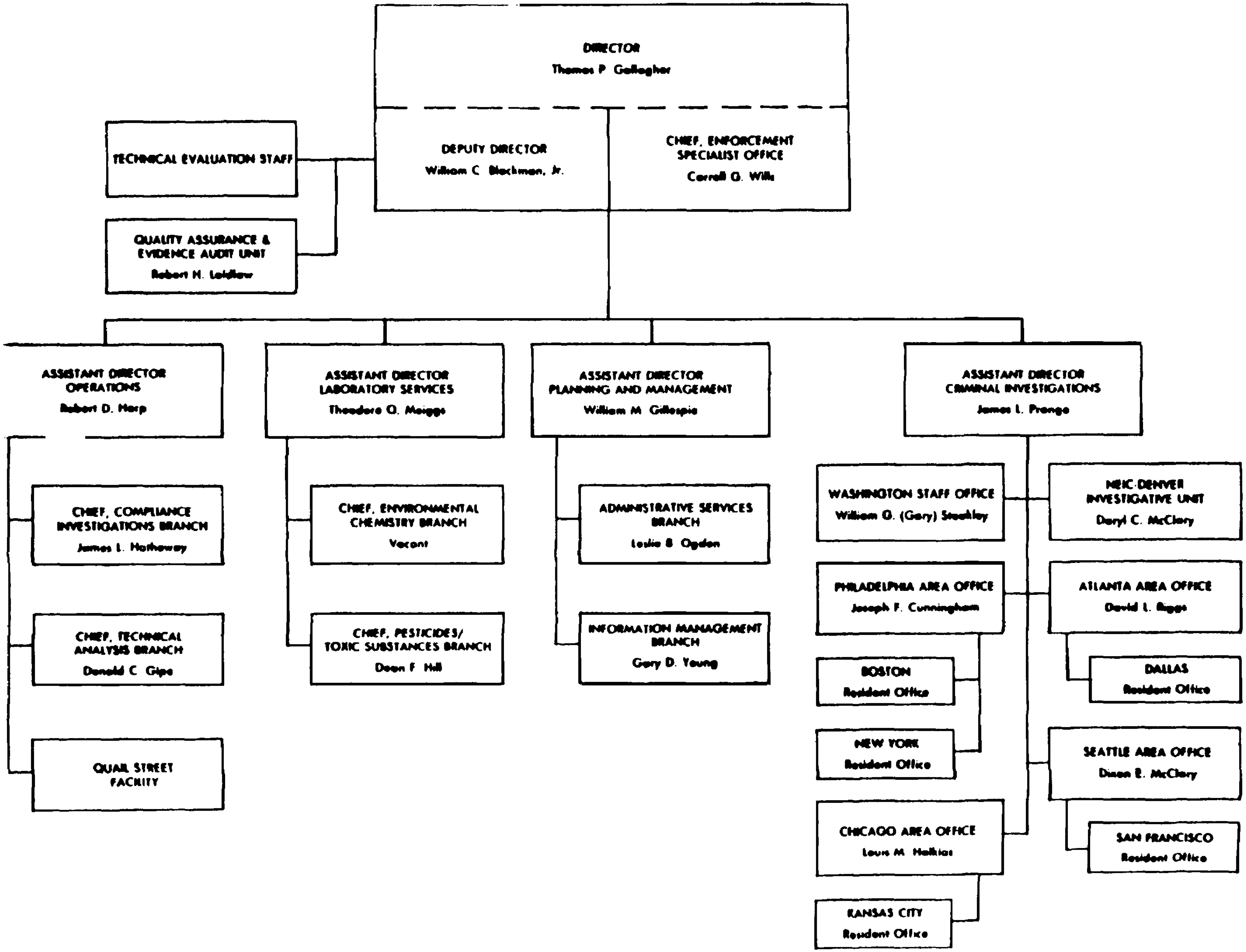
5. THE NATIONAL ENFORCEMENT INVESTIGATIONS CENTER

The National Enforcement Investigations Center, located in Denver, Colorado, functions as a national comprehensive technical support and investigative unit for EPA's civil and criminal litigation. The NEIC's expertise in investigation and evidence discovery can be extremely helpful in assisting in case development. The Office of Enforcement and Compliance Monitoring is responsible for establishing NEIC priorities.

Specific assistance that may be provided by NEIC include:

- Planning, developing, and presenting evidence and information interpretation for case preparation
- Conducting legal and technical information searches
- Providing consultation and assistance in case preparation activities
- Providing management training and specialized assistance on criminal investigations
- Providing expert testimony in support of enforcement actions.

An NEIC organizational chart and telephone directory are attached.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ASSISTANT DIRECTOR CRIMINAL INVESTIGATIONS
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James Arnold, SA 257-4748
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ALLISON, G.	EPA 2340	8-776-5143
BLACKMAN, W.	EPA 2321	8-776-5120
GALLAGHER, T.	EPA 2320	8-776-5100
GILLESPIE, W.	EPA 2330	8-776-5111
HARP, R.	EPA 2350	8-776-5136
McCLARY, Daryl	EPA 2381	8-776-5128
MEIGGS, T.	EPA 2360	8-776-5132
OGDEN, L.	EPA 2332	8-776-5111
PRANGE, J.	EPA 2390	8-776-5128
WILLS, C.	EPA 2370	8-776-5128

OFFICE OF AIR AND RADIATION

OFFICE OF MOBILE SOURCES

FIELD OPERATIONS AND SUPPORT DIVISION

BUILDING #55

Erv Pickell, Chief	FTS 776-7524
Wendy Reed, Secretary	FTS 776-7524
Commercial	303/236-7524

Charles Aschwanden, Attorney/Advisor	FTS 776-7524
Bob Chivvis, Environmental Engineer	FTS 776-7524
Marcia Ginley, Attorney/Advisor	FTS 776-7524
Judy Graham, Attorney/Advisor	FTS 776-7524
Jim Kellerstrass, Physical Science Engineer	FTS 776-7524
Judy Lubow, Attorney/Advisor	FTS 776-7524
Molly Magoon, Paralegal	FTS 776-7524
Jack McLaughlin, Physical Science Technician	FTS 776-7524
Darrell Williams, Attorney/Advisor	FTS 776-7524
Commercial	303/236-7524

6. CONTRACT LABORATORY PROGRAM (CLP)

The CLP is a service program designed to provide a wide range of enforcement-quality analytical services to support Agency enforcement actions. Although CLP primarily supports the Agency's Superfund effort, it also supports RCRA enforcement actions.

6.1 OVERVIEW OF CASE DEVELOPMENT ASSISTANCE ACTIVITIES

The CLP supports case development by ensuring that CLP-generated analytical data are controlled and available for litigation. The CLP, in cooperation with the EPA National Enforcement Investigations Center (NEIC), has established detailed procedures and documentation to ensure that CLP sample data meets Agency enforcement standards. While a brief description of CLP procedures are provided in this overview, the following sections provide more detailed information on each aspect of the CLP.

Enforcement activities frequently require direct CLP support. Court appearances and other mandated deadlines often do not allow sufficient time for completion of the normal Case file purge package submission, review and audit process. In this event, CLP assistance may be required. Also, data package evaluation and/or testimony from laboratory or CLP personnel may be needed.

The CLP has established procedures to meet these short-term requirements through the Sample Management Office (SMO), which coordinates and responds to enforcement-related requests. This process is described in the following sections.

a. Request Procedures

Requests are originated by a Regional counsel, NEIC or other appropriately designated EPA personnel, and are submitted in a memorandum to the National Program Office (NPO) Program Manager (PM). The PM reviews the memorandum, determines necessary CLP action and forwards the request along with his directions for action to SMO. If a request requires immediate response, the requestor should contact SMO directly by telephone and relay the request, following up with the written request memorandum to the PM.

b. Requestor Information Required

The following information must be provided by the requestor to initiate CLP action:

- Name and telephone number of Regional contact coordinating the enforcement activity
- Case/SAS number(s) of specific site sampling(s)
- Sample number(s)
- Date(s) of sample collection
- Laboratory(ies) that performed the analysis
- Type of support needed

Most requests can be met quickly; however, a two-week lead-time is strongly recommended.

c. Documentation/Support Provided by CLP

In responding to enforcement support requests, SMO provides the following support:

- Arranges for the timely delivery of all laboratory and evidence documentation relating to specific sample analyses (within a minimum of seven days of request, if designated).
- Obtains information relating to sample analysis or handling not specifically required under laboratory contracts.
- Arranges for expert testimony by laboratory or CLP personnel.
- Augments Regional resources for analytical data review.

Data Review Services

A full range of review services are used to assess CLP data. Objectives of the review services are:

- To determine the usability and limitations of data given particular field or policy assessment criteria.
- To maximize the amount of usable data by identifying critical properties of data and by resolving or proposing solutions to analytical or quality control problems.

- To provide systematic and standardized data quality assessment and status summary to determine method, laboratory, and program performance.

These review services are performed by a number of operations:

- Review for data usability is performed by Regional personnel and contractors as a service for the clients for whom sampling and analyses have been performed. Recommended review procedures have been standardized and organized into functional guidelines for evaluating CLP data. EPA Data Validation Work Groups have produced specific documents for review of organic, inorganic, and dioxin analyses.
- Comprehensive QA review is performed by Environmental Monitoring Systems Laboratory/Las Vegas (EMSL/LV) on specific data packages. Review and assessment of some program-wide QA results is also performed by EMSL/LV to evaluate method and laboratory performance, and the quality of analytical data.
- Review of completeness and contract compliance of key criteria in CLP data is performed by SMO on all Organic Routine Analytical Services (RAS) data. Completeness of all Special Analytical Services (SAS) in CLP data is performed by SMO on all RAS data. Completeness of all SAS data is also determined. Results are used for payment recommendation purposes and also to provide summary information on program status and performance.
- Under direction of the CLP management, EMSL/LV and/or SMO may perform additional data review, to assess a problem Case or provide a second opinion on usability.

Regional client requests for Data Review Services should be directed to the Regional Deputy Project Officer (DPO). For SMO review, as copy of the request should be submitted to SMO (Attention: Data Review Team) and a copy should be provided to the Regional Sample Control Center. In follow-up,the DPO must notify SMO that the request is authorized. Alternatively, the DPO may choose to initiate all requests for the Region.

Upon authorization by the DPO, SMO schedules the review and notifies the requestor of the date the review is scheduled for completion. It should be noted that review cannot be initiated until all deliverables for the subject Case(s) have been received from the laboratory.

All requests should be placed using the SMO Data Review Request memorandum. Copies are available from SMO.

Requestor Information Required

In completing the Data Review Request form, the client must provide the following information for each Case for which review is requested:

- SMO Case number
- Site name
- Analytical laboratory name(s)
- Number of samples
- Sample list
- Type(s) of review requested
- Requested date for review completion
- User name and contact
- Intended use of data

A minimum lead time of two weeks is required for data review. However, review time is variable depending upon the number of samples involved and the nature of the review. If conflicts occur, the appropriate DPO(s) will be notified and asked to prioritize requests.

Documentation Provided by CLP

An evaluation report, including a sample/result matrix, and supporting statistics and documentation, is produced with each type of review.

The QA/QC Compliance Review report indicates for each sample fraction whether the data are considered: acceptable, acceptable given qualifications noted, or unacceptable. Reasons for the designation are discussed and completed data review forms for each of the areas of performance are included in the report to the client.

The contents and format of reports for Problem Case, Applications, and Consulting Reviews are determined by the nature of the data problem(s) being examined and/or the purpose for which the data will be used. Any statistical measures used to define data quality and the raw data supporting conclusions are appended to these reports.

Excerpts from the User's Guide to the Contract Laboratory Program are reproduced below that provide a description of the CLP organization, the CLP's analytical services and three auxiliary program services (sample bottle repository program, enforcement support, and data review services) and how these services may be accessed and a program directory containing addresses and telephone numbers of key program personnel.

6.2 PROGRAM MANAGEMENT

6.2.1 National Program Office (NPO)

The CLP is directed by the National Program Office, in EPA Headquarter's Analytical Support Branch (ASB), Hazardous Response Support Division (HRSD), Office of Emergency and Remedial Response (OERR), in Washington, DC. The NPO is comprised of the National Program Manager; Organic, Inorganic and Dioxin Technical Project Officers (PO); the Sample Management Office Project Officer; and a Quality Assurance (QA) Officer.

6.2.2 Sample Management Office (SMO)

The contractor-operated Sample Management Office functions in direct support of the NPO, providing management, operations and administrative support to the CLP. The primary objective of the SMO operation is to facilitate optimal use of program analytical resources. SMO activities fall into the following areas:

- Sample scheduling and tracking
- Contract compliance screening
- Special analytical services subcontracting
- Laboratory invoice processing
- Maintenance of CLP records and management reporting
- NPO management, technical and administrative support.

SMO routinely receives analytical requests from the Regions, coordinates and schedules sample analyses, tracks sample shipment and analyses, receives and checks data for completeness and compliance, processes laboratory invoices, and maintains a repository of sampling records and program data. In response to client requests for non-routine types of analyses, SMO subcontracts for Special Analytical Services (SAS), performing scheduling and tracking for SAS efforts as outlined above. SMO maintains a comprehensive data base of CLP services, performance and utilization, and generates a variety of management and user reports.

6.2.3 USEPA Office of Research and Development (ORD), Environmental Monitoring Systems Laboratory/Las Vegas (EMSL/LV)

Program quality assurance support is provided by EPA ORD through EMSL/LV. EMSL/LV functions as the quality assurance arm of the CLP, providing advice and support to the NPO.

6.2.4 National Enforcement Investigations Center (NEIC)

The NEIC advises the NPO in defining and applying program enforcement requirements. NEIC developed sample custody procedures, chain-of-custody records, sample tags, and custody seals; which are utilized in the CLP to maintain the validity of sample analyses for supporting Agency enforcement actions.

6.2.5 Regional Sample Control Centers

In January, 1984, each Region established a Regional Sample Control Center (RSCC) to centralize ordering of CLP sample analyses within the Region. The RSCC is comprised of three or more individuals designated as CLP Authorized Requestors, with one individual named as the Primary Authorized Requestor (AR) directing the RSCC. The RSCC is responsible for coordinating the level of Regional sampling activities to correspond with monthly allocations of CLP analyses, where applicable. The Primary AR makes final determinations regarding Regional analysis priorities when conflicts occur. RSCC ARs routinely place all Regional requests for CLP analyses, coordinate with SMO during sampling and sample shipment, and resolve any problems which arise concerning the samples. The RSCC serves as the central point of contact for questions concerning Regional sampling efforts.

6.3 ANALYTICAL AND SUPPORT CONTRACTORS

6.3.1 Contract Analytical Laboratories

The CLP's analysis contractors come from the nationwide community of chemical analytical laboratory facilities. To become part of the CLP, laboratories must meet stringent requirements and standards for equipment, personnel, laboratory practices, analytical operations, and quality control operations.

The CLP operates four separate analytical programs:

- Organic Routine Analytical Services (RAS)
- Inorganic RAS
- Dioxin RAS
- Special Analytical Services (SAS).

Organic, inorganic and dioxin RAS program analyses are performed by a network of laboratories operating under firm, fixed-price contracts with the EPA, which provide analytical services to clients. The SAS program provides unique, non-standardized analytical services to clients for organic, inorganic, dioxin and other compounds in a variety of matrices, to meet specific analytical requirements which do not fall under RAS programs. SAS services are provided through individual fixed-price subcontracts awarded to qualified laboratories.

Tables 6-1 and 6-2 outline the menu of services available under the CLP's RAS and SAS programs. The User's Guide to the Contract Laboratory Program U.S. EPA, OERR, December 1986, should be consulted for more detailed descriptions of these analytical programs. The client should carefully consider the provisions of each CLP analytical program during the planning stages of a sampling event to determine the applicability of the analysis to user needs.

Table 6.1

MENU OF ROUTINE ANALYTICAL SERVICES

Category	RAS Organic Analysis	RAS Inorganic Analysis	RAS Dioxin Analysis
Sample Matrices	Low & Medium Concentration Water & Soil/Sediment Samples	Low & Medium Concentration Water & Soil/Sediment Samples	Low & Medium Concentration Soil/Sediment Samples
Compounds Identified & Quantified	HSL Compounds & Library Matches of 30 Highest Compounds (In the ppb Range)	Metals & Cyanide (In the ppb Range)	2,3,7,8-TCDD (In the ppb Range)
Deliverables	Extraction in 5 Days for H_2O & 10 Days for Soil Samples VOA Analysis in 10 Days for H_2O & 10 Days for Soil Samples Data Delivery in 30, 40 or 45** Days	Data Delivery in 30 or 35** Days	Data Delivery in 15 or 30 Days Automatic Rerun Data 10 Days Following Initial Data Due Date
Analytical Procedures	GC/MS Analysis Following Sample Preparation/Extraction	Flame/Flameless & Cold Vapor AA, ICP & Colorimetric Analysis	GC/MS Analysis by FSCC Following Solvent Extraction/Clean-Up
QA/QC	Surrogate Spike in Each Sample MS & MS Duplicate Per 20 Samples, Per Case, For Each Matrix & Concentration On Per-Fraction Basis	Matrix Spike (MS) & Duplicate Per Case,* Per 20 Samples For Each Matrix & Concentration	MS & Duplicate Per Batch of 24 Samples or Less

*A Case designates a group of samples collected at one site or geographical location during a specific finite period of time.

**As specified by contract schedule.

Table 6.2

MENU OF SPECIAL ANALYTICAL SERVICES (SAS)

RAS Plus SAS Category	All SAS Category
Examples of Services Available:	Examples of Services Available:
• Fast Turnaround Analysis by RAS Organic, Inorganic or Dioxin IFB Protocol	• Organic Analysis Per Non-RAS Protocols, Matrices, Compounds
• RAS/Organic Analysis with Additions/Adjustments to IFB Protocols.	• Inorganic Analysis Per Non-RAS Protocols, Matrices, Compounds
• RAS Inorganic Analysis with Additions/Adjustments to IFB Protocol	• Dioxin Analysis Per Non-RAS Protocols, Matrices, Compounds
• RAS Dioxin Analysis with Additions/Adjustments to IFB Protocol	• Organic and Inorganic High Concentration Sample Preparation and Analysis
	• Special Topics Analysis (As Requested)

NOTE: The client requestor is responsible for designating IFB method adjustments in RAS Plus SAS work and for supplying suitable analytical protocols for All SAS work. Additionally, the client must provide QA/QC procedures and criteria, and must specify analysis and data reporting delivery schedules. This information must accompany the client's request for SAS services.

6.4 ORGANIC ROUTINE ANALYTICAL SERVICES (RAS)

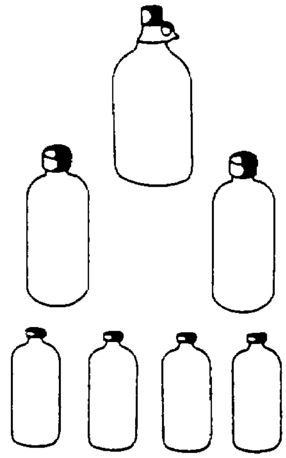
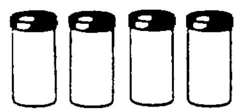
6.4.1 Sample Matrices, Concentration Levels and Volumes Required

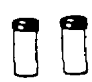
The organic RAS contract methods apply to analysis of water (aqueous) and soil/sediment samples. Samples for analysis should be single-phase, homogeneous samples of a similar matrix. Sample matrices other than water, sediment or soil are processed through the SAS program.

Organic RAS contract methods determine concentrations of organic compounds ranging from low or environmental levels of concentration to medium levels, where a compound may comprise as much as 15 percent of the total sample, at the lowest appropriate detection limits. Low level samples are considered to be those collected off-site, around the perimeter of a waste site, or in areas where hazards are thought to be significantly reduced by normal environmental processes. Medium level samples are most often those collected on-site, in areas of moderate dilution by normal environmental processes. Low and medium level designations are made in the field by the sampler to determine packaging and shipment procedures only. Low and medium level analysis designations are performed within the laboratory to determine the appropriate analytical protocol to be used. For soil/sediment samples only, there are separate procedures for semi-volatiles organics analysis depending upon whether the samples are determined to be low (>20 ppm) or medium (20 ppm) concentration.

The sample volume and container types required for RAS organic analysis vary according to the matrix and estimated concentration level of the sample For RAS organic analysis of a water sample estimated as low level, one gallon sample volume is required for extractables - base, neutral, acid (B/N/A) and pesticides/PCB, and 80 ml for volatiles (VOA). The extractables sample is collected in two 80-ounce amber glass bottles, four 1-liter amber glass bottles, or one 4-liter amber glass bottle. The volatiles sample is collected in two 40-ml glass vials. For RAS organics analysis of a water sample

ORGANIC SAMPLE COLLECTION REQUIREMENTS

WATER SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
EXTRACTABLE ANALYSIS (LOW LEVEL)	1 GALLON		1 × 4-LITER AMBER GLASS BOTTLES OR 2 × 80-OZ. AMBER GLASS BOTTLES OR 4 × 1-LITER AMBER GLASS BOTTLES
EXTRACTABLE ANALYSIS (MEDIUM LEVEL*)	1 GALLON		4 × 32-OZ. WIDE-MOUTH GLASS JARS
VOLATILE ANALYSIS (LOW OR MEDIUM LEVEL*)	80 ML		2 × 40-ML GLASS VIALS

SOIL/SEDIMENT SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
EXTRACTABLE ANALYSIS (LOW OR MEDIUM LEVEL*)	6 OZ.		1 × 8-OZ. WIDE-MOUTH GLASS JAR OR
			2 × 4-OZ. WIDE-MOUTH GLASS JARS
VOLATILE ANALYSIS (LOW OR MEDIUM LEVEL*)	240 ML		2 ×120-ML WIDE-MOUTH GLASS VIALS

*ALL MEDIUM LEVEL SAMPLES TO BE SEALED IN METAL PAINT CAN FOR SHIPMENT

estimated as medium level, a four-liter volume is required for extractables and 80 ml for volatiles. The extractables sample should be collected in four 32-ounce glass jars, and the volatiles sample in two 40-ml glass vials. For RAS organics analysis of a soil/sediment sample estimated as low or medium level, a six-ounce volume is required for extractables. The sample should be collected in one 8-ounce glass jar for extractables and two 120-ml glass vials for volatiles.

For a laboratory to perform matrix spike, matrix spike duplicates, and contractual reanalyses, triple the sample volume is required in at least one sample in twenty, for each sample with the same concentration/matrix. Additionally, for water samples, one field blank should be supplied per case, and one volatile trip blank should be supplied per shipment. No additional volume is required for soil sample duplicate analyses. Soil blanks are supplied to Regions by EMSL/LV. Use of aqueous blanks for soil samples is not appropriate.

For shipping purposes, each sample estimated as medium level (water or soil) must be enclosed and sealed in a metal paint can for shipment. Because it is not certain whether a sample is actually low or medium level, volume should be collected as specified for low level samples; however, shipping procedures must be followed as designated for medium level samples.

Sample portions for volatile analysis (water and soil) should be collected so that the containers are completely filled, leaving no headspace.

If sufficient sample volume is not provided, completion of all required parameters and/or complete QA/QC determinations may not be possible. If this occurs, SMO will contact the RSCC to determine appropriate adjustments in analysis.

6.4.2 Compounds Identified and Quantified

The organic RAS program provides identification and quantification of EPA Target Compound List (TCL) (previously termed the Hazardous Substances List -- HSL) organic compounds (VOA, B/N/A, and pesticide/PCB fractions) in water and soil/sediment samples.

6.4.3 Contract Deliverable Requirements

The organic RAS program specifies contractually required deliverables by the laboratory for sample extraction, volatile analysis and data reporting. These requirements include:

- Completion of sample extraction for water samples within 5 days of sample receipt and for soil samples within 10 days of sample receipt
- Completion of volatile analysis for water samples within 7 days of sample receipt and for soil samples within 10 days of sample receipt
- Completion of extractable analysis and reporting of data within 30 or 40 days (as specified by the existing contract delivery schedule) following sample receipt, or 21 days for organic/inorganic analysis under new contracts.

The organic RAS data package provides a complete set of data for independent review by the client user. Through review of data package components, the client can determine the quality of the analytical data.

Each organic RAS data package includes the following components:

- Narrative report, describing analytical problems encountered and internal QC processes applied
- Copies of sample Traffic Reports
- Quality control summary, containing surrogate, method blank, matrix spike and matrix spike duplicate analyses recoveries, and instrument tuning and performance information
- Sample data, including tabulated results of the organic TCL (HSL) compounds identified and quantified, and the tentative identification and estimated concentration of up to 30 non-TCL (HSL) organic compounds in greatest apparent concentration, reported in ug/l or mg/kg
- Raw sample analytical data, including sample chromatograms, spectra, quantitation reports, and calculations
- Standards data package, including chromatograms, spectra and data system printouts and initial and continuing calibration reports
- QC data package, documenting instrument tuning and analytical QC criteria.

6.5 INORGANIC ROUTINE ANALYTICAL SERVICES (RAS)

6.5.1 Sample Matrices, Concentration Levels, Volumes Required and Preservation Techniques

The inorganic RAS contract methods apply to analysis of water and soil/sediment samples. Samples for analysis should be single-phase, homogeneous samples of an appropriate matrix. Sample matrices other than water, sediment or soil are processed through the SAS program.

Inorganic RAS contract methods determine concentrations of inorganic priority pollutant constituents ranging from low or background levels of concentration to medium levels, where a compound may comprise up to 15 percent of the total sample. Low level samples are generally those collected off-site, around the perimeters of a waste site, or in areas where hazards are thought to be significantly reduced by normal environmental processes. Low level samples are estimated to contain less than 10 ppm of the inorganic priority pollutant (PP) contaminants. Medium level samples are most often those collected on-site, in areas of moderate dilution by normal environmental processes. Medium level samples are estimated to contain concentrations of inorganic PP contaminants up to 15 percent. Low and medium level designations are made for sample collection volume and shipment purposes, and for determination of appropriate analytical methods and QA/QC requirements. Samples estimated to contain concentrations of any PP contaminant higher than 15 percent of the sample must be sent through High Concentration SAS for sample preparation and analysis.

The sample volume, container types, and preservations required for inorganic analysis vary according to the matrix and estimated concentration level of the sample. For RAS inorganic analysis of a water sample estimated as low level, 1-liter volume is required for metals analysis and 1-liter volume is required for cyanide analysis. These samples should each be collected in a 1-liter polyethylene bottle. For RAS inorganic analysis of a water sample estimated as medium level, 16-ounce volume is required for metals and 16-ounce volume for cyanide. These samples should each be collected in a 16-ounce glass jar. For RAS inorganic analysis of a soil sample estimated as low or medium level, 6-ounce sample volume is required for both metals and cyanide analyses. These samples should each be collected in an 8-ounce glass jar.

For the inorganics RAS program only, it is recommended that a case of samples be collected over no more than a three-day period and samples shipped collectively when the Case is completed.

The standard procedure applied by the analytical laboratory for homogenization is to shake the sample in its original sample container and transfer 100-mL aliquots to a 250-mL beaker. For aqueous samples with high solids content, the user has the option to specify the the sample not be mixed and the analysis be performed on the supernatant. When collecting low level water samples, different preservation techniques apply to the metals and cyanide portions, as follows. For "total" metals analyses, the sample is acidified to pH 2 with HNO3. Note of caution: if the sample contains a significant particulate fraction, acidification without filtration could result in deceptively high metal values for the water sample. Varying amounts of particulate matter can also give large differences in metal values for duplicate acidified water samples.

For the cyanide aliquot, the following guidelines should be followed:

- Test a drop of sample with potassium iodide-starch test paper (KI-starch paper); a blue color indicates the presence of oxidizing agents and the need for treatment. Add ascorbic acid, a few crystals at a time, until a drop of sample produces no color on the indicator paper. Then add an additional 0.6g of ascorbic acid for each liter of sample volume.
- Test a drop of sample on lead acetate paper previously moistened with acetic acid buffer solution. Darkening of the paper indicates the presence of S^{2-}. If S^{2-} is present, add powdered cadmium carbonate until a drop of the treated solution does not darken the lead acetate test paper and then filter the solution before raising the pH for stabilization.

- Preserve samples with 2 ml of 10 N sodium hydroxide per liter of sample (pH 12).
- Store the samples such that their temperature is maintained at 4 C until the time of analysis.

No chemical preservation is required for medium level water samples or low or medium soil samples.

For soil samples the standard procedure applied by the analytical laboratory for homogenization is to thoroughly mix the contents of the sample container. For solid samples with significant amounts of water, the user has the option to specify that the supernatant be decanted and the remaining sample be mixed thoroughly and analyzed.

Each sample estimated as medium level (water or soil) must be enclosed and sealed in a metal paint can for shipment. If it is not certain whether a sample should be categorized as low or medium concentration, volume should be collected and the sample preserved as specified for low level samples; however, shipping procedures must be followed as designated for medium level samples. For water samples, one field blank should be supplied for each Case. Soil blanks are currently not available. It is recommended that the user not submit soil field blanks for analysis. If the user submits a rinsate blank with a case of soil samples, it will be treated as a separate aqueous matrix sample with full QC and accordingly, a sufficient volume for analysis should be provided to the laboratory. When a suitable soil blank material becomes available through EMSL, one soil blank will be supplied for each Case. No additional volume is required for duplicate analyses of either water or soil samples.

The user may specify that the duplicate and matrix spike be performed on a particular sample. If sufficient sample volume is not provided, analysis of all required parameters and/or complete QA/QC determination may not be possible. If this occurs, SMO will contact the RSCC to determine appropriate adjustments in analysis.

Required sample volume and container types for inorganic RAS analysis of water and soil samples are illustrated in the following figure. Pre-cleaned sample bottles are available through the Sample Bottle Repositories.

6.5.2 Constituents Identified and Quantified

The inorganic RAS program provides identification and quantification of metals and cyanide in water and soil/sediment samples.

6.5.3 Contract Deliverable Requirements

The inorganic RAS program specifies contractually-required deliverables for completion of metals and cyanide analysis and submission of the final data package within 30 or 35 days (as specified by the contract delivery schedule) following sample receipt at the laboratory, and 21 days for new contracts.

The inorganic RAS data package provides a complete set of data for independent review by the client user. Through review of data package components, the client can determine the quality of the analytical data.

Each inorganic RAS data package includes the following components:

- Cover page, listing the samples included in the report and narrative comments describing problems encountered in analysis
- Tabulated results of inorganic compounds identified and quantified, reported in ug/l or mg/kg, including a brief description of the sample
- Individual analytical results are flagged by the laboratory when QC indicates potential bias due to matrix effects, homogeneity, etc.
- QC results for: preparation blanks, calibration blanks, calibration verification standards, matrix spikes, duplicates, laboratory control samples, interference check samples, analytical spikes and serial dilution analyses
- Tabulation of instrument detection limits determined in pure water solutions

INORGANIC SAMPLE COLLECTION REQUIREMENTS

WATER SAMPLES	REQUIRED VOLUME	CONTAINER TYPE
METALS ANALYSIS (LOW LEVEL)	1 LITER	1 × 1-LITER POLYETHYLENE BOTTLE
METALS ANALYSIS (MEDIUM LEVEL*)	16 OZ.	1 × 16-OZ. WIDE-MOUTH GLASS JAR
CYANIDE (CN^-) ANALYSIS (LOW LEVEL)	1 LITER	1 × 1-LITER POLYETHYLENE BOTTLE
CYANIDE (CN^-) ANALYSIS (MEDIUM LEVEL*)	16 OZ.	1 × 16-OZ. WIDE-MOUTH GLASS JAR

SOIL/SEDIMENT SAMPLES	REQUIRED VOLUME	CONTAINER TYPE
METALS AND CYANIDE (CN^-) ANALYSIS (LOW OR MEDIUM LEVEL*)	6 OZ.	1 × 8-OZ. WIDE-MOUTH GLASS JAR OR 2 × 4-OZ. WIDE-MOUTH GLASS JARS

*ALL MEDIUM LEVEL SAMPLES TO BE SEALED IN METAL PAINT CAN FOR SHIPMENT

- Digestion/distillation logs, sample traffic reports, and raw data system printouts identifying calibration standards, calibration blanks, preparation blanks, samples and any atypical dilution, duplicates, spikes, interference checks and any instrument adjustments or apparent anomalies on the measurement record.

6.6 DIOXIN ROUTINE ANALYTICAL SERVICES (RAS)

6.6.1 Sample Matrix and Volume Required

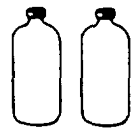
The dioxin RAS contract method applies to analysis of soil/sediment and water samples. Soil/sediment and water samples for analysis should be single-phase, homogeneous and of a similar matrix. Sample matrices other than soil/sediment or water are processed through the SAS program.

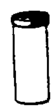
The dioxin RAS contract method determines the presence of the 2,3,7,8-tetrachlorodibenzo-p-dioxin isomer in soil/sediment and water samples. No concentration levels are designated in the dioxin program. All samples suspected to contain dioxin are considered hazardous and handled accordingly.

The sample volume required to perform RAS dioxin analysis is four ounces of soil/sediment or 2 liters of water (see Figure _____). Each soil sample should be collected in either one 4-ounce glass jar or one 8-ounce glass jar filled one-half full. Each water sample should be collected in two 1-liter amber glass bottles. The collection of more than the required sample volume is strongly discouraged due to the hazardous nature and difficulty of disposing of dioxin-contaminated waste. Each dioxin sample must be enclosed and sealed in a metal paint can for shipment.

One or more field blanks should be included with each sample batch (24 or fewer samples). The sampler must designate one field blank for fortified matrix spike analysis and one field sample for duplicate analysis. A rinsate sample, consisting of trichloroethylene used in rinsing sampling equipment, may be included in a batch. (Rinsates are the only liquid samples analyzed in the dioxin RAS program.) The sample volumes indicated are sufficient for duplicate analysis; no additional volume should be collected.

DIOXIN SAMPLE COLLECTION REQUIREMENTS

WATER SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
2,3,7,8-TCDD ANALYSIS (MULTI-CONCENTRATION)	2 LITERS		2 × 1-LITER AMBER GLASS BOTTLES

SOIL/SEDIMENT SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
2,3,7,8-TCDD ANALYSIS (MULTI-CONCENTRATION)	4 OZ.		1 × 4-OZ. WIDE-MOUTH GLASS JAR
			OR
			1 × 8-OZ. WIDE-MOUTH GLASS JAR

HIGH HAZARD SAMPLE COLLECTION REQUIREMENTS

LIQUID OR SOLID SAMPLES	REQUIRED VOLUME		CONTAINER TYPE
ORGANIC AND INORGANIC ANALYSIS	6 OZ.		1 × 8-OZ. WIDE-MOUTH GLASS JAR

*ALL MEDIUM LEVEL SAMPLES TO BE SEALED IN METAL PAINT CAN FOR SHIPMENT

Per program procedures, a QA sample should be included and identified in each sample batch. Prepared Performance Evaluation (PE) samples are available to regions through EMSL/LV for this purpose. PE samples should be included as part of the sample batch.

6.6.2 Isomer Identified and Quantified

The dioxin RAS program identifies and quantifies the 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) isomer of dioxin in soil/sediment and water samples.

6.6.3 Contract Deliverable Requirements

The dioxin RAS program specifies: completion of sample extraction, clean-up analysis, and data reporting within 21 days following sample receipt at the laboratory, including automatic re-extraction and re-analysis of samples where certain criteria are not met in the initial analysis.

The dioxin RAS data package provides a complete set of data for independent review by the client user. Through review of data package components, the client can determine the quality of the analytical data.

Each dioxin RAS data package includes the following components:

- Completed data reporting sheets with appropriate selected ion current profiles (SICPs) and spectra attached, indicating instrumental (GC/MS) operating parameters during data acquisition and including all rejected sample runs
- Results of analyses of multi-level concentration calibration solutions, including SICPs, calculated response factors, and computer-generated quantitation reports
- SICPs generated during each performance check solution analysis and each concentration calibration solution analysis
- Chronological list of all analyses performed.

6.7 SPECIAL ANALYTICAL SERVICES (SAS)

In addition to the standardized analyses provided under the Routine Analytical Services (RAS) program, the CLP's Special Analytical Services (SAS) program provides clients with limited customized or specialized analyses, different from or beyond the scope of the RAS IFB contract protocols, but consistent with program objectives. Services provided through SAS include: quick-turnaround analyses, verification analyses, analyses requiring lower detection limits than RAS methods provide, identification and quantification of non-priority pollutant and non-TCL (HSL) constituents, general waste characterizations, analysis of non-standard matrices, and other specific analyses.

SAS functions as an extension of the RAS program, matching unique client needs with individual laboratory resources to accommodate varied analytical requests, often in a short or emergency timeframe. Individual SAS subcontracts are solicited, awarded and administered by Viar and Company, as part of the company's contract with the EPA for operation of the Sample Management Office (SMO). The SAS mechanism, by utilizing the subcontracting process, allows the CLP to procure specialized services in a timely manner, on an as-needed basis. The flexibility of the SAS program expands the CLP's capabilities from standardized RAS organic, inorganic and dioxin contract analyses, to include a wide variety of additional, non-routine analytical services.

The client requestor provides SMO with the analytical methods and QA/QC requirements needed for each SAS. SMO procures SA by subcontracting with CLP RAS laboratories or, when RAS laboratories cannot meet the analytical requirement of the SAS, with other laboratories which have demonstrated the ability to meet program performance requirements. RAS contract laboratories are evaluated for current RAS performance before they are considered for SAS organic, inorganic, dioxin and high concentration analysis requests are solicited to CLP laboratories with IFB contracts in the appropriate analytical program, and that are performing in accordance with contractural requirements. Other laboratories qualify to perform certain types of SAS work by successful completion of performance evaluation sample analyses or by justification of unique analytical capability.

Once the laboratory universe is determined, SMO initiates solicitation via telephone, contacting a minimum of three laboratories (contingent upon availability of a particular analytical service) and describing the requirements. Laboratories are asked to bid firm, fixed price(s) for the performance of specific types of analyses on a defined number of samples. Laboratory bids are evaluated by SMO in terms of bid price and responsiveness to the specified task. The SAS award is made to the lowest bidding laboratory which responds to the program's analytical requirement. A written, individual SAS subcontract agreement is then made between the laboratory and Viar and Company (the SMO contractor for laboratory performance of specified analytical work).

A laboratory's ability to bid for SAS work and the prices being bid may vary depending on: the size or scope of the analytical request; data turnaround requirements and analytical parameters of a particular task; weekly RAS sample loading; and laboratory operating conditions at the time of solicitation. Due to the fluctuation of these factors on a weekly and, often, daily basis, the CLP may not be able to accommodate all SAS requests received. Currently, SAS services are provided on a first-come basis; however, Agency requirements can necessitate that certain work be given priority. In this event, SMO notifies the involved RSCC Primary Authorized Requestors, who determine Regional sampling priorities.

An analysis request can be processed through SAS only if the types of samples to be analyzed or the analysis requirements are different from those of the RAS program. (Consult earlier sections of this chapter for RAS sample types and analysis requirements.) SAS requests are separated into two basic categories: "RAS Plus SAS" and "All SAS." These categories are utilized in defining client requests and pursuant SAS solicitation and contract award. Analytical services available through the SAS program are described in the following sections.

6.7.1 SAS Services

6.7.1.1 RAS Plus SAS

Fast Turnaround

A fast turnaround request is a request for routine (RAS) analyses with extraction, analysis or data delivery required in a shorter timeframe than the RAS contracts provide. Fast turnaround requests require application of existing RAS analytical parameters, methodologies and detection limits, altering only the time required for performance of analysis and/or delivery of data.

In responding to fast turnaround requests, SAS procurement is limited by and dependent upon program sample load, laboratory capacities and laboratory operating conditions at the time of the request. Because of constant fluctuations of these factors, it is not possible to obtain fast turnaround service on an unlimited basis. Therefore, fast turnaround contracts are solicited only in situations of demonstrated need, and are used primarily to support EPA emergency actions and to meet impending litigation deadlines.

The following illustrates common "RAS Plus SAS" fast turnaround requests, with the SAS portion underlined:

- TCL (HSL) volatile organic compound analysis with VOA analysis and data delivery in 5 days
- IFB inorganic compound analysis with data turnaround in 10 days
- IFB dioxin compound analysis with data turnaround in 5 days.

Organic - Special Requirements in Addition to RAS

A common client request is to access the standardized or RAS organic program and add to the contract requirements. Any addition to the standard RAS Target Compound List - TCL (equivalent to Hazardous Substances List - HSL) organic analysis requirements constitutes this type of SAS request. The following examples illustrate common "RAS Plus SAS" organic requests, with the SAS portion underlined:

- TCL (HSL) volatile compound analysis at lower detection limits than required by the IFB
- TCL (HSL) full organic analysis with additional non-TCL (HSL) pesticide/herbicide compounds
- TCL (HSL) pesticide compound analyses with minor alterations or additional procedures applied
- TCL (HSL) B/N/A compound extraction with analysis by a non-TCL (HSL) method.

Inorganic - Special Requirements in Addition to RAS

As with organics, it is common for a client to request the standardized inorganic RAS program and add to the contract requirements. Any addition to the standard RAS inorganic analysis requirements constitutes this type of SAS request. The following examples illustrate common "RAS Plus SAS" inorganic requests, with the SAS portion shown underlined:

- Metals and cyanide analyses plus non-IFB parameters - nitrate, sulfate, ammonia, sulfide, total organic carbon and chloride
- Metals and cyanide analyses with rigorous sample homogenization
- Metals analysis at lower detection limits than required by the IFB
- Metals and cyanide analysis with minor alterations or additional procedures applied.

Dioxin - Special Requirements in Addition to RAS

A client may need to access the standardized dioxin RAS program and add to the contract requirements. Any addition to the standard dioxin analysis requirements constitutes this type of RAS plus SAS request. The following examples illustrate "RAS Plus SAS" dioxin requests, with the SAS portion underlined:

- 2,3,7,8-TCDD analysis of soil/sediment samples with a detection limit lower than 1 ppb
- 2,3,7,8-TCDD analysis plus analysis of other dioxin or furan isomers.

6.7.1.2 All SAS

CLP clients frequently request types of analyses that are outside the scope of or not directly applicable to the RAS program. This occurs most often with samples of difficult or unusual matrices and requests to measure analytical parameters not provided through the RAS program. In these situations, requests are met through a SAS-contracting process referred to as "All SAS." Five categories of "All SAS" requests are described in the following sections.

Organic - Special Requirements Not Provided by RAS

- Seven TCL (HSL) PCB arochlors analysis only (i.e., not the entire IFB pesticide fraction)
- Non-TCL (HSL) compound analysis
- Organic extraction of non-aqueous and non-soil/sediment samples (e.g., oil, tar or biological tissue samples by a non-IFB extraction procedure)
- Organic analysis by non-RAS methods.

Inorganic - Special Requirements Not Provided by RAS

- Specified IFB element analysis only (e.g., cadmium, mercury and selenium)
- Non-IFB parameter analysis (e.g., total organic carbon, sulfate, TSS)
- EP Toxicity tests (metals, pesticides or herbicides)
- Any inorganic preparation/analysis of non-aqueous and non-soil/sediment samples (e.g., oil, tar or biological tissue) by a non-IFB procedure
- Metals analysis by non-RAS methods.

Dioxin - Special Requirements Not Provided by RAS

- 2,3,7,8-TCDD in fish tissue (e.g., matrix other than soil/sediment)
- 2,3,7,8-TCDF (furan) in any matrix
- Total tetra- through octa- dioxin and/or furan classes in varied matrices
- Analysis by HRGC/HRMS or GC/MS/MS.

High Concentration Sample Analysis - Organic and Inorganic

The SAS program provides for extraction and analysis of High Concentration (HC) samples. HC sample analysis will eventually be implemented under the RAS program. HC analysis services are described below:

- Organic extraction and analysis for TCL (HSL) compounds by GC/MS with tentative identification of 30 non-TCL (HSL) compounds of greatest concentration
- Inorganic preparation/analysis for total metals and total mercury.

Special Topics Analysis

The SAS program can also accommodate unusual analytical requests on an all "All SAS" basis, when sufficient lead time is allowed and complete methodology and QA/QC specifications accompany the request. These types of analyses include, but are not limited to:

- Biological samples (e.g., fish, turtle tissue) for specific organic, inorganic or dioxin analyses
- Air samples (e.g., tenax, charcoal and flurosil tubes) for specific organic analyses
- Wipe samples for specific organic or inorganic analyses
- Methods comparison/evaluation studies
- Asbestos analysis
- Acid deposition parameters
- Non-Superfund analytical services of any type.

6.8 SAMPLE BOTTLE REPOSITORY PROGRAM

6.8.1 Types and Quantities of Containers Available

Under the Sample Bottle Repository operation, ten types of sample containers are available to CLP clients for use in hazardous waste sampling activities. Containers provided through this program are precleaned and QC-tested according to prescribed procedures to ensure that no contamination exists that might affect sample data results. (Sample coolers and sample preserving agents are no supplied through the Repository program.)

6.8.2 Ordering Procedures

The Sample Bottle Repository program may be used by any organization scheduling sample analysis through the CLP, and is commonly accessed by Regional and remedial contractor clients. Two individuals from each organization are designated by SMO as Repository Authorized Requestors (RARs) and only these individuals may place container requests through the program. State personnel should access the program through their EPA Regional office.

Users should contact SMO initially to become authorized to order from a Repository and to obtain a supply of Delivery Request forms. Thereafter, the RAR requests containers directly from the Repository. Since the Repository can respond only to requests submitted by a SMO-designated RAR, users must promptly notify SMO of any change in RAR designations.

There are three types of container requests, defined by the amount of time between the date the order is placed and the requested delivery date:

- Routine Request - Fifteen or more working days lead-time for delivery.
- Fast-Turnaround Request - More than three days, but less than fifteen days lead-time for delivery.
- Emergency Request - Less than three days lead-time for delivery.

Routine requests are mailed to the appropriate Repository utilizing the Delivery Request (DR), a three-part carbonless form. The DR must be signed by an RAR. The top (original) copy of the completed DR is sent to the Repository at the address indicated on the form, the second copy is retained for the user's file, and the third copy is sent to SMO.

Fast-turnaround and emergency requests should be called in to the appropriate Repository, at the telephone number provided on the form, and the written Delivery Request distributed as outlined above, to confirm the order. When placing a telephone order, the RAR must give the Repository the DR number for the request and provide the corresponding written DR in follow-up.

Users should submit requests a minimum of two weeks in advance of the required delivery date, whenever possible, to ensure timely and completely delivery of containers. Emergency and fast-turnaround requests are filled on an "as available" basis from the Repository's emergency inventory stock. It may not be possible to respond to all emergency and fast-turnaround requests, as response depends on Repository inventory and in-process requests.

In the event that a request is canceled, the user must immediately contact the Repository to verbally cancel the request, and follow up with a cancellation memo to the Repository, sending a copy of the memo to SMO. Cancellation memos, as well as all other project-related correspondence, should cite the appropriate DR number.

6.8.3 Shipment Information

Upon receipt of the Delivery Request, Repository personnel schedule shipment and begin preparing the request. Repository personnel immediately notify the RAR if for any reason the request cannot be met in full by the requested delivery date. Often, partial shipments can be arranged over several days to meet the client's requirement. If concurrent requests are received at the Repository that cannot be filled in a timely manner and if partial shipments cannot be satisfactorily arranged, the Repository immediately notifies SMO, which coordinates with the involved Regional Sample Control Center(s) in determining the priority of container requests based on the Region's sampling needs.

Each carton in a Repository shipment is marked "Box ___ of ___," and a Repository Packing List (PL) is included in Box 1 of each shipment, so that the designee can verify that the entire shipment has been received. In addition, the Repository sends two copies of the shipping PL to the RAR at the time of shipment. The RAR confirms with the designee that the entire shipment was received in good condition, then enters the date of receipt and signs the packing list in the space indicated to confirm receipt. The RAR must return a copy of the signed packing list to SMO within seven days of shipment receipt.

6.9 ANALYSIS INITIATION/REQUEST PROCEDURES

6.9.1 RAS Initiation Process

a. User Information Required

To initiate a RAS request, the RSCC Authorized Requestor contacts the appropriate SMO Coordinator by telephone and provides a complete description of the analytical requirement. (SMO personnel are identified in the CLP Directory, Appendix A.)

SMO requires the following information to initiate a RAS request:

- Name of RSCC Authorized Requestor.
- Name(s), association, and telephone number(s) of sampling personnel.
- Name, city, and state of the site to be sampled.
- Superfund site/spill ID (2 digit alpha-numeric code).
- Dioxin tier assignment, where applicable.
- Number and matrix of samples to be collected.
- Types of analyses required.
  Organics: full (VOA, B/N/A and pesticides/PCB) or VOA and/or B/N/A and/or pesticides/PCB.
  Inorganic: metals and/or cyanide.
  Dioxin: 2,3,7,8-TCDD.
- Scheduled sample collection and shipment dates.
- Nature of sampling event (i.e., investigation, monitoring, enforcement, remedial, drilling project, Cercla Cooperative Agreements).
- Suspected hazards associated with the sample and/or site.
- Other pertinent information which may affect sample scheduling or shipment (i.e., anticipated delays due to site access, weather conditions, sampling equipment).
- Name(s) of Regional or contractor contacts for immediate problem resolution.

The Authorized Requestor is responsible for applying professional judgement in accurately estimating the numbers and types of samples and the sample shipment dates of analytical request.

b. Lead-Time Requirement

When planning for a sampling activity has been completed and at least one week prior to the scheduled start of sampling, the AR telephones SMO and places the specific request for RAS services. In order to facilitate laboratory scheduling and resolution of questions concerning sampling and analysis procedures, and to allow the sampler adequate time to prepare the required sample documentation, the RSCC is required to provide scheduling information by noon on Wednesday of the week prior to sample shipment. Advance scheduling is available and should be utilized whenever possible.

c. Case Number Assignment and Laboratory Scheduling

At the time of request, SMO assigns a sequential Case number to each individual RAS sampling activity. The RSCC records the Case number and uses it in referencing that request throughout sampling and analysis. A Case number designates a single group of samples collected at one site or geographical location during a predetermined and finite time period and is used to identify a particular RAS sampling event throughout sample tracking and data production.

6.9.2 SAS Initiation Process

a. User Information Request

To initiate a SAS request, the RSCC Authorized Requestor contacts the appropriate SMO Coordinator by telephone and provides a complete description of the analytical requirement. (SMO personnel are identified in the CLP Directory, Appendix A.)
SMO requires the following information to initiate a SAS request:

- Name of RSCC Authorized Requestor.
- Name(s), association, and telephone number(s) of sampling personnel.

- Name, city, and state of the site to be sampled.
- Superfund site/spill ID (2 digit alpha-numeric code).
- Number and matrix of samples to be collected.
- Specific analyses required and appropriate protocols and QA/QC.
- Required detection limits.
- Matrix spike and duplicate frequency.
- Data turnaround and data format.
- Justification for fast turnaround request, if appropriate.
- Scheduled sample collection and shipment dates.
- Nature of sampling event (i.e., investigation, monitoring, enforcement, remedial, drilling project, Cercla Cooperative Agreements).
- Suspected hazards, associated with the samples and/or site.
- Other pertinent information which may affect sample scheduling or shipment (i.e., anticipated delays due to site access, weather condition, sampling equipment).
- Name(s) of Regional or contractor contacts for immediate problem resolution.

In follow-up to the verbal request, the AR must submit a completed SAS Client Request form to SMO. This form serves as the written record to clarify and confirm the client's requirement for specialized analysis work.

The Authorized Requestor is responsible for applying professional judgment in accurately estimating the numbers and types of samples and the sample shipment dates of the SAS request. Overestimation of the number of samples to be collected and/or miscalculation of shipment dates unnecessarily ties up available laboratory capacity, preventing the efficient management of CLP analytical resources and rendering the program less than maximally responsive to all clients. Underestimation of the numbers and types of samples to be collected may mean that adequate services will not be available for any additional analyses needed. Depending on the size and extent of the miscalculation, it may require that the entire request be resolicited, and sampling plans postponed accordingly.

b. Lead-Time Requirements

When planning for a sampling activity has been completed, the AR telephones SMO and places the specific request for SAS services. Because SAS services are individually procured on a competitive basis, a minimum lead-time of two weeks is required to process as completely defined SAS request. More lead-time is strongly recommended whenever possible. SAS solicitation will not be started until the SAS requirements have been completely defined by the AR. Modifications to any SAS request will cause the entire process to begin again. Fully-defined requests initiated with less than two weeks, lead-time may not be solicited and awarded in time to meet the original shipment date.

Certain types of requests require a longer lead-time, as follows. A minimum lead-time of two to three weeks is required for SAS requests which involve distribution of protocols (reference item d., this section). A minimum lead-time of four or more weeks is recommended for large-scale, analytically complex and/or non-Superfund SAS requests. Award of non-Superfund SAS subcontracts may only be made after the appropriate funding process is complete.

The AR should consider the above-outlined criteria in determining the lead-time required to schedule a particular SAS effort. As a general rule, due to protocol diversity and laboratory procurement procedure, accessing SAS demands greater advance planning and more lead-time than that required for the standardized RAS programs. The AR should contact SMO several weeks in advance if there is a question regarding the advance time needed to schedule a particular SAS request.

c. SAS Number Assignment and Laboratory Scheduling

At the time of request, SMO assigns a sequential SAS number for each individual SAS sampling activity. If SAS services are being provided in association with RAS services, SMO also designates the assigned case number. The AR records the SAS number and case number (if applicable) and uses both case and SAS numbers in referencing the request throughout sampling and analysis. Like the case identification, the SAS number designates a single group of samples collected at one site or geographical location during a predetermined and finite time period, and is used to identify a particular SAS sampling event throughout sample tracking and data production.

6.10 SAMPLE DOCUMENTATION AND PACKAGING

6.10.1 Sample Documentation

Each sample processed by the CLP must be properly documented to ensure timely, correct, and complete analysis for all parameters requested, and most importantly, to support use of sample data in potential enforcement actions concerning a site. The CLP documentation system provides the means to individually identify, track, and monitor each sample from the point of collection through final data reporting. As used herein, a sample is defined as a representative specimen collected at a specific location of waste site at a particular point in time for a specific analysis, and may reference field samples, duplicates, replicates, splits, spikes, or blanks, that are shipped from the field to a laboratory. Specific CLP sample documentation requirements are described in the following sections.

6.10.1.1 Sample Traffic Report (TR)/Usage, Distribution, Ordering

The sample documentation system for the RAS organic and inorganic programs is based on the use of the EPA sample Traffic Report, a four-part carbonless form printed with a unique sample identification number. One Traffic Report and its preprinted identification number is assigned by the sampler to each sample collected. The two types of TRs are included in Appendix B, along with examples of properly completed TR forms. (High Concentration TRs are used when HC preparation and analysis is performed through the RASA plus SAS mechanism and will be used for the RAS HC Program when it is implemented.)

To provide a permanent record for each sample collected, the sampler completes the appropriate TR, recording the Case Number, site name or code and location and site/spill ID,analysis laboratory, sampling office, dates of sampling collection and shipment, and sample concentration and matrix. Numbers of sample containers and volumes are entered by the sampler beside the analytical parameter(s) requested for particular sample portions.

After completing the TR, the sampler includes the bottom two copies in the sample shipment to the laboratory. Following sample shipment, the sampler returns the top copy of the completed TYR to SMO. The second copy is the sampler's file copy. Upon receipt of samples, the analytical laboratory documents sample condition and signs the TR, returning the signed copy to SMO, and keeping a laboratory file copy. Copies of the laboratory-signed TRs are provided to the RSCC as part of the data package.

A strip of adhesive sample labels printed with the TR sample number come attached to the TR for the sampler's use in labeling sample bottles. The sampler affixes one of these numbered labels to each container making up the sample. In order to protect the label from water and solvent attack, each label must be covered with clear waterproof tape. The sample labels, which bear the TR identification number, permanently identify each sample collected and link each sample component throughout the analytical process.

When a RAS sample is to be analyzed for RAS with SAS treatment (described in Chapter II as "RAS Plus SAS" request), TR forms are used for the "RAS Plus SAS" samples. A SAS Packing List is not required in addition to the TR. Both the RAS Case number and the SAS number must be entered on the TR line requesting "Case Number." Both numbers are required in order to clearly identify and track the sampling event. Caution is to be taken not to include the Case Number on "All SAS" samples taken at the same site. Additionally, the sampler must document a brief description of the SAS requirement on each TR. For example, "VOA - 1 ppb detection limit."

Traffic Report forms are provided by SMO to each Region through the RSCC. One of the RSCC ARs should contact SMO two or more weeks in advance to order additional TRs for the Region.

6.10.1.2 Dioxin Shipment Record (DSR)/Usage, Distribution, Ordering

Sample documentation for the RAS dioxin program utilizes the CLP Dioxin Shipment Record, a four-part carbonless form. The DSR provides a record for one shipment batch of dioxin samples (up to 24 samples). Samples are individually numbered using the pre-printed labels provided by SMO with the supply of DSRs, and each sample number is entered on the DSR by the sampler. A copy of the DSR is included in Appendix C, along with an example of a properly completed DSR form.

To provide a permanent record of each sample collected, the sampler completes the DSR, first recording the appropriate CLP Case number and Batch/Shipment number. Header information pertinent to all samples is then entered, including: site name/code, tier designation, data turnaround (15 or 30 days), sampling office, sampling contact, sampling data, date of shipment, and analysis laboratory. Sample matrix and description information (e.g., soil/sediment field sample, solvent rinsate) is recorded for each sample by checking the appropriate box following each sample number.

After completion of the DSR, the sampler includes the bottom two copies with the sample shipment to the laboratory. Following sample shipment, the sampler returns the top copy of the DSR to SMO. The second copy is the sampler's file copy. Upon receipt of the sample shipment, the laboratory documents sample condition and signs the DSR, returning a copy to SMO and keeping a file copy. Copies of the laboratory-signed DSRs are provided to the RSCC as part of the data package.

As indicated, two strips of adhesive sample labels pre-printed with unique sample numbers are provided with the DSR for the sampler's use in labeling both the sample bottle and the outside of the paint can in which the sample is packed. In order to protect the labels from water and solvent attack, labels on both the sample container and the paint can are covered with clear, waterproof tape. The sample labels permanently identify each sample collected throughout the analytical process.

Dioxin Shipment Record forms are provided by SMO to each Region through the RSCC. One of the RSCC ARs should contact SMO two or more weeks in advance to order additional DSRs.

6.10.1.3 SAS Packing List (PL)/Usage, Distribution, Ordering

Only for "All SAS" samples, are samplers to utilize the SAS Packing List, a four-part carbonless form. The PL provides a space to list up to 20 samples on one form. SAS samples are numbered using the SAS number followed by a hyphen and progressive numerical designation, starting with 1 (e.g., 2000E-1, 2000E-2, 2000E-3, etc.) If the sampling activity extends over several days and more than one PL is used, care must be taken not to repeat sample numbers. A copy of the SAS Packing List is included in Appendix C, along with an example of a properly completed PL form. Regions/samplers should consult SMO to verify that the PL is appropriate to use in their situation.

To provide a permanent record of each sample collected, the sampler completes the PL, recording the SAS number, site name and location, sampling date, shipment date, analysis laboratory, sampling office, sampler name and telephone number, individual SAS sample numbers, sample description and analytical parameters requested.

After completing the PL, the sampler includes the bottom two copies with the sample shipment to the analysis laboratory. Following sample shipment, the sampler sends the top copy to SMO. The second copy is the sampler's file copy. Upon receipt of samples, the analysis laboratory documents sample condition and signs the PL, returning a copy to SMO and keeping a laboratory file copy. Copies of the laboratory-signed PLs are provided to the RSCC as part of the SAS data package.

Adhesive sample labels must be provided by the sampler and marked with the appropriate SAS sample numbers using indelible ink. Labels are secured to each sample container, and covered with clear waterproof tape to protect the label from the effects of water and solvent(s). The sample label permanently identifies each sample collected and links each sample component throughout the analytical process.

SAS Packing Lists are provided by SMO to each Region through the RSCC. One of the RSCC ARs should contact SMO two or more weeks in advance to order additional SAS PLs.

6.10.1.4 Sample Tag

To render sample data valid for Agency enforcement use, individual samples must be traceable continuously from the time of collection until the time of introduction as evidence during litigation. One mechanism utilized in the CLP to comply with enforcement requirement is the use of the "sample tag." Each sample removed form a waste site and transferred to a laboratory for analysis is identified by a sample tag containing specific information regarding the sample, as defined by the EPA National Enforcement Investigations Center (NEIC). Following sample analysis, sample tags are retained by the laboratory as physical evidence of sample receipt and analysis, and may later be introduced as evidence in Agency litigation proceedings. Sample tags can be obtained through the Regional office.

The information recorded on an EPA sample tag includes:

- CLP Case/SAS No(s). - The unique number(s) assigned by SMO to identify the sampling event. (Entered under "Remarks" heading.)
- CLP Sample No. - The unique sample identification number (from the TR, DSR or PL) used to document that sample. (Entered under "Remarks" heading.)
- Project Code - The number assigned by EPA to the sampling project.
- Station No. - A two-digit number assigned by the sampling team coordinator.
- Date - A six-digit number indicating the month, day and year of collection.
- Time - A four-digit number indicating the military time of collection.
- Station Location - The sampling station description as specified in the project plan.
- Samplers - Signatures of samplers on the project team.
- Remarks - Case/SAS and sample numbers are entered here, and any pertinent comments indicated.

- Tag No. - A unique serial number pre-printed or stamped on the tag.
- Lab Sample No. - Reserved for laboratory use.

Additionally, the sample tag contains appropriate spaces for noting that the sample has been preserved and indicating the analytical parameter(s) for which the sample will be analyzed.

Each sample tag is completed and securely attached to the sample container. Samples are then shipped under chain-of-custody procedures as described in the following section.

6.10.1.5 Chain-of-Custody Record

Official custody of samples must be maintained and documented from the time of sample collection up to introduction as evidence in court, in accordance with Agency enforcement requirements. The following custody documentation procedure was developed by NEIC and is used in conjunction with CLP sample documentation (i.e., Traffic Report, Dixon Shipment Record and SAS Packing List for all samples processed through the CLP.

A sample is considered to be in an individual's custody if the following criteria are met: it is in your possession or it is in your view after being in your possession; or it was in your possession and then locked up or sealed to prevent tampering; or it is in a secured area. Under this definition, the team member actually performing the sampling is personally responsible for the care and custody of the samples collected until they are transferred or dispatched properly. In follow-up, the sampling team leader reviews all field activities to confirm that proper custody procedures were followed during the field work.

The Chain-of-Custody Record is employed as physical evidence of sample custody. Chain-of-Custody Record forms can be obtained through the Regional office. The sampler completes a Chain-of-Custody Record to accompany each cooler shipped from the field to the laboratory.

Similar information to that entered on the sample tag is recorded on the Chain-of-Custody Record. Header information includes the project number, samplers' signatures and the CLP Case/SAS number (entered on the upper right of the form). Do not include the commonly known name of the site, as CLP laboratories may perform work for the responsible party of that site. For each station number, the sampler indicates: date, time, whether the sample is a composite or grab, station location, number of containers, analytical parameters, CLP sample number(s) (from TR, DSR or PL), and sampling tag number(s). When relinquishing the samples for shipment, the sampler signs in the space indicated at the bottom of the form, entering the date and time the samples are relinquished. The sampler enters shipper name and airbill number under the "Remarks" section on the bottom right of the form.

The custody record is completed using waterproof ink. Any corrections are made by drawing a line through and initialing the error, then entering the correct information. Erasures are not permissible.

The top, original signature copy of the Chain-of-Custody Record is enclosed in plastic (with CLP sample documentation) and secured to the inside of the cooler lid. A copy of the custody record is retained for the sampler's files.

Shipping coolers are secured and custody seals are placed across cooler openings. As long as custody forms are sealed inside the sample cooler and custody seals remain intact, commercial carriers are not required to sign off on the custody form.

Whenever samples are split with a source or government agency, a separate Chain-of-Custody Record should be prepared for those samples, including with whom the samples are being split and sample tag serial numbers from splits.

The laboratory representative who accepts the incoming sample shipment signs and dates the Chain-of-Custody Record to acknowledge receipt of the samples, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal log books and records that provide a custody record through sample preparation and analysis.

6.10.2 Sample Packaging and Shipment

6.10.2.1 Packaging Requirements

Samples processed through the CLP must be packaged for shipment in compliance with current U.S. Department of Transportation (DOT) and commercial carrier regulations. All required government and commercial carrier shipping papers must be filled out and shipment classifications made according to current DOT regulations.

Traffic Reports, Dioxin Shipment Records, SAS Packing Lists, Chain-of-Custody Records, and any other shipping/sample documentation accompanying the shipment, must be enclosed in a waterproof plastic bag and taped to the underside of the cooler lid.

Coolers must be sealed with custody seals in such a manner that the custody seal would be broken if the cooler were opened.

Shipping coolers must have clearly visible return address labels on the outside. Shipping coolers that are labeled in this manner will be returned to the sampler by the laboratory within 14 days following laboratory sample receipt.

Inside the cooler, sample containers must be enclosed in clear plastic bags through which sample tags and labels are visible. Dioxin samples as well as water and soil samples suspected to be of medium or high concentration or those suspected to contain dioxin must be enclosed in a metal can with a clipped or sealable lid (paint cans are normally used for this purpose) and surrounded by packing material such as vermiculite. The outer metal can must be labeled with the number of the sample contained inside.

Water samples for low or medium level organics analysis and low level inorganics analysis <u>must</u> be shipped cooled to 4 C with ice. <u>No ice</u> is to be used in shipping inorganic low level soil samples or medium/high level water samples; or organic high level water or soil samples or dioxin samples. Ice is not required in shipping soil samples, but may be utilized at the option of the sampler. All cyanide samples; however, must be shipped cooled to 4 C. Low and medium level water samples for inorganic analysis require chemical preservation.

Waterproof, metal ice chests or coolers are the only acceptable type of sample shipping container. Shipping containers should be packed with non-combustible, absorbent packing material (vermiculite is recommended) surrounding the plastic-enclosed, labeled sample bottles (or labeled metal cans containing samples) to avoid sample breakage in transport. Sufficient packing material should be used so that sample containers will not make contact during shipment. Earth or ice should never be used to pack samples. Earth is a contaminant, and ice melts resulting in container breakage. Ice should be in sealed plastic bags to prevent melting ice from soaking packing material which, when soaked, makes handling of samples difficult in the lab.

Unless otherwise instructed through SMO in advance, the laboratory disposes of unused sample volume, sample bottles and packing materials 60 days following data submission.

6.10.2.2 Shipping Instructions

Samples for organics analysis must be shipped "Priority One/Overnight." If shipment requires more than a 24-hour period, sample holding times can be exceeded compromising the integrity of the sample analyses.

Samples for inorganics analysis should be held until sampling for the Case is complete and shipped "Standard Air" for two-day delivery. In the RAS inorganic program, three days is the recommended period for collection of a Case of samples.

All samples should be shipped through a reliable commercial carrier, such as Federal Express, Emery, Purolator, or equivalent. Sampling offices are responsible for sample shipping charges.

6.10.2.3 Shipment Coordination

To enable SMO to track the shipment of samples from the field to the laboratory and ensure timely laboratory receipt of samples, the sampler must notify SMO of all sample shipments on the day of shipment. At that time, the sampler should provide the following information:

- Sampler name and phone number.
- Case Number and/or SAS Number of the project.
- Site name/code.
- Batch numbers (dioxin only)
- Exact number(s), matrix(ces) and concentration(s) of samples shipped.
- Laboratory(ies) samples were shipped to.
- Carrier name and airbill number(s) for the shipment.
- Method of shipment (e.g., overnight, two-day).
- Date of shipment.
- Suspected hazards associated with the samples or site.
- Any irregularities or anticipated problems with the samples, including special handling instructions, or deviations from established sampling procedures.
- Status of the sampling project (e.g., final shipment, update of future shipping schedule).

Sample shipments made after 5:00 PM EST should be called in to SMO at the start of business the next day (8:00 AM EST). SMO must be notified by 3:00 PM EST Friday concerning information on sample shipments going out Friday intended for Saturday delivery/pickup. CLP laboratories remain open to receive or pick-up Saturday shipments only upon advance notification by SMO and only when shipment information has been provided to SMO by the sampler.

The success of sample shipment coordination depends on the proper use and handling of the sample tracking forms and on timely and complete communication among the RSCC, samplers, SMO, and laboratories. Any postponements or cancellations, changes in the number or type of samples to be collected or shipping dates must be communicated to SMO as soon as this information is known, to facilitate this process.

7. TECHNICAL ENFORCEMENT SUPPORT AT HAZARDOUS WASTE SITES CONTRACTS

The U.S. EPA Office of Waste Programs Enforcement (OWPE) has awarded four contracts for Technical Enforcement Support at Hazardous Waste Sites (TES). The first TES contract (TES 1) was awarded to GCA/Technology Division in June 1983 and ended in 1985. The second TES contract (TES 2) was awarded to PRC Environmental Management Inc. in October 1984 and ended in 1987. The third contract (TES 3) was awarded to Camp Dresser and McKee, Inc. in July 1986 and TES 4 was awarded to Jacobs Engineering in September 1986. Jacobs and CDM are prime contractors for teams made up of several speciality sub-contractors, each team capable of providing a wide range of technical skills and services directed at support for the enforcement activities undertaken by OWPE and the Regions.

The TES contractors provide the technical support and expertise necessary to allow EPA to follow up more effectively on RCRA administrative and judicial orders, through the execution of a wide range of enforcement-related tasks. The types of services available include the following work areas:

- Responsible party search
- Title search
- Financial assessment
- Records compilation
- Health/endangerment assessment
- Hydrogeologic/geologic studies
- Special studies
- Feasibility studies
- Sample analysis
- Biological testing
- Technical review of document
- Expert witness/consultant
- Interrogatory preparation
- Evidence storage/preservation
- Compliance monitoring
- Evidence audits
- Cost recovery documentation

The TES contracts cannot be used to hire attorneys for litigation support. The TES contracts should be used when resources and skills available inside EPA are either insufficient or unavailable to continue escalation of the enforcement actions underway.

A User's Guide to accessing the TES contracts and contacts is attached.

CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) of 1980 and the Resource Conservation and Recovery Act (RCRA) of 1976 and the RCRA Amendments of 1984, the U.S. Environmental Protection Agency (EPA) is responsible for developing and implementing enforcement actions, negotiating compliance agreements, and performing compliance inspections of hazardous waste facilities. Within EPA, these responsibilities have been delegated to the Office of Waste Programs Enforcement (OWPE).

To provide support in carrying out its CERCLA and RCRA enforcement responsibilities, OWPE has procured the services of Technical Enforcement Support (TES) contractors. The current TES contractors are as follows:

- PRC Environmental Management, Inc. (TES II)
- Camp, Dresser & McKee, Inc. (TES III)
- Jacobs Engineering Group, Inc. (TES IV).

All three are prime contractors for teams made up of several specialty subcontractors, each team capable of providing a wide range of technical skills and services directed at support for the enforcement activities undertaken by OWPE and the regions. Under CERCLA, the TES contractors assist OWPE in conducting enforcement investigations and compliance actions and in recovering cleanup funds from responsible parties. Under RCRA, they support OWPE in conducting inspections, reviewing and in some cases designing corrective actions, and providing case support for negotiations with responsible parties or for litigation referrals to the U.S. Department of Justice.

The purpose of this users' manual is to establish a standard set of operating and management procedures to assist EPA Headquarters and regional personnel in effectively and efficiently managing the TES contracts. In addition, the users' manual is intended to define the roles and responsibilities of EPA and contractor personnel in managing and executing the TES contracts.

The remainder of this introduction describes the structure of the manual and briefly discusses instructions for its use.

1. STRUCTURE OF THE USERS' MANUAL

The users' manual consists of seven chapters, an appendix and a bibliography. This chapter, Chapter I, provides an introduction to the manual, a description of its structure, and how it can be used. Each of the remaining chapters is described briefly below:

Chapter II -- Scope and Provisions of the Technical Enforcement Support Contracts describes the background and structure of the TES contracts and contractor requirements in executing Statement of Work (SOW) activities.

Chapter III -- Contract Management: Organization, Roles and Responsibilities highlights the organization and key management roles, responsibilities and interactions of Federal and contractor personnel (e.g., EPA Project Officer (PO), EPA Contracting Officer (CO), EPA Regional Contact (RC), EPA Primary Contact (PC), TES Contractor Zone Program Manager (ZPM), TES Regional Manager (RM), and TES Project Manager (PM)).

Chapter IV -- Procedures for Initiating and Managing TES Activities discusses the process for issuing work assignments to the TES contractor and provides detailed instructions for the completion of all the required forms and reports.

Chapter V -- TES Contractor Quality Assurance Progams describes a generic quality asurance (QA) program for the TES contractors, its structure, its framework, and its procedures.

Chapter VI -- Monitoring Project Performance and Financial Management describes the TES contractor reporting requirements and EPA procedures for tracking and assessing project performance.

Chapter VII -- Performance Evaluation Plan describes the criteria, procedures, and forms to be used in evaluating contractor performance.

In addition to these chapters, there is also an Attachment to the manual that presents information on other EPA contracts and programs that interface with TES, TES task-type descriptions, site account numbers, SCAP activity links, and examples of completed Work Assignment Performance Evaluation Reports and Performance Evaluation

Summary Reports. Also included is a bibliography that lists references offering detailed information on subjects and matters related to the TES contracts. Finally, in a separate volume II, there is an appendix that provides examples of statements of work and contractor work plans.

2. USING THE MANUAL

As previously mentioned, there are three TES contracts currently underway (TES II, TES III and TES IV). The types of services provided under these contracts are essentially identical. The management and operating procedures discussed in the following chapters of this manual are applicable to all three contracts except where otherwise noted.

The information contained in this manual has been organized to permit EPA Headquarters and regional personnel, as well as TES contractor personnel, to have easy access to specific procedures and responsibilities pertaining to TES contracts management and implementation. Each chapter is separated by a tab labeled with the area of contract management covered in the chapter. Following the tab is a table of contents indicating the pages where detailed discussions of specific procedures and terms to be used can be found in the chapter. A loose-leaf format has been used to facilitate updating and to enable users to supplement the text with notes and pertinent references appropriate to their own activities.

CHAPTER II

SCOPE AND PROVISIONS OF THE TECHNICAL ENFORCEMENT SUPPORT CONTRACTS

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SCOPE AND PROVISIONS OF THE TECHNICAL ENFORCEMENT SUPPORT CONTRACTS

KEY TOPICS

CHAPTER II

SCOPE AND PROVISIONS OF THE TECHNICAL ENFORCEMENT SUPPORT CONTRACTS

The Office of Waste Programs Enforcement (OWPE) in the Office of Solid Waste and Emergency Response (OSWER) is responsible for executing EPA's enforcement activities as they relate to the CERCLA and RCRA laws. EPA has contracted with three Technical Enforcement Support (TES) contractors to assist OWPE in carrying out these enforcement activities. This chapter provides an overview of the TES contracts including a description of the background and structure of the contracts, the types of services that can be accessed through the contracts, and the requirements that must be met by the contractors in performing the work.

1. BACKGROUND AND STRUCTURE OF THE TES CONTRACTS

The following sections highlight background information applicable to the TES contracts and include discussions of the types of contracts, the structures of the contracts, the periods of performance, and other general descriptive information pertaining to the contracts.

1.1 Type of Contracts

There are three TES contracts currently in operation: TES II, which is organized on a nationwide basis and operated by PRC Environmental Management, Inc.; TES III, which covers Zone 1 and is operated by Camp, Dresser & McKee, Inc.; and TES IV, which covers Zone 2 and is operated by Jacobs Engineering Group, Inc. Zone 1 consists of Regions I-IV. Zone 2 consists of Regions V-X.

All three TES contracts are level-of-effort (LOE) contracts and, as such, allow specific tasks to be assigned to the contractors on an as-needed basis, within the restrictions of the overall contract Statement of Work (SOW) and within the technical labor hours and dollar ceilings established by the contracts.

The TES III and IV contracts are also Cost-Plus-Award-Fee (CPAF) contracts. Under CPAF contracts, the contractors are guaranteed a fixed base fee, paid in monthly installments, to which an award fee can be added. A complete description of the CPAF aspects of the TES III and IV contracts is presented in Chapter VII.

1.2 Period of Performance

The TES II contract began on October 1, 1984, and ends on September 30, 1987. The TES III contract began on June 30, 1986 and ends on September 30, 1987. The TES IV contract began on September 30, 1986 and ends on September 30, 1987. Both the TES III and TES IV contracts contain options to extend the period of performance one additional period of 24 months, if desired.

The total capacity of the TES II contract is currently booked up. TES III and IV, since they are both relatively new, still have extensive capacity. TES III level of effort for the base year is 240,000 hours. TES IV is also 240,000 hours. If the option to extend the TES III and IV contracts is exercised, an additional 285,000 hours will be available under each contract.

1.3 Nature of Work to Be Performed

The types of technical enforcement support to be provided under the TES contracts are described in detail in the contracts' SOW, which is included in Attachment B. These technical support services will be provided primarily to the Regional Contacts and Primary Contacts in the ten EPA regional offices and EPA Headquarters (the eleventh region). Within the overall enforcement support effort, tasks to be performed include:

- Responsible party searches
- Design of enforcement studies
- Title search
- Financial Assessment
- Records Compilation
- Data Management
- Health/environmental assessments
- Field work
- Hydrogeologic/geologic studies
- Other special studies
- Enforcement feasibility studies
- Focused feasibility studies
- Sample analysis
- Biological testing
- Technical review of documents
- Expert witnesses/consultants
- Interrogatory preparation
- Evidence storage/preservation
- Compliance monitoring/review of responsible party plans
- Quality Assurance
- Cost recovery documentation
- RCRA inspection activities

- Review, analysis and evaluation of RCRA facilities and compliance
- Evidence audits
- Policy and program support
- Oversight and responsible party actions
- Community Relations
- Training.

These tasks are described in detail in the contracts' SOW, shown in Attachment B. All EPA and contractor personnel involved with the TES contracts should be thoroughly familiar with the contract SOW.

1.4 Zone Crossover

The TES III and IV zone contractors may be required to provide services outside of their own zone. This may occur in the event of a conflict of interest or in any other situation deemed by the Contracting Officer (CO) to be in the best interest of the Government. For example, the following circumstances might warrant a zone crossover:

- A TES contractor that has worked for a Potentially Responsible Party (PRP) at a particular site where services are to be provided

- Outstanding and specialized expertise and experience possessed by one contractor (e.g., expert witness)

- Overextending a contractor's ability to perform particular services in its own zone

- Underbooking of one zone contractor's base period LOE.

Any use of a contractor outside its zone must be coordinated by the appropriate Regional Contact, Headquarters Project Officer (PO), and CO.

1.5 Contract Equipment

The TES contractors are responsible for the maintenance of all equipment provided to them by EPA. They are also responsible for ensuring that disposable equipment inventories are maintained and replenished as required.

If new equipment requirements are identified as EPA missions change, the Regional Contact may request this new equipment by sending a written request for its purchase to the EPA PO. This request should include justification of the needs, estimated cost, and recommended source. EPA may either provide the required equipment to the contractor or authorize the contractor to acquire it under the TES contract.

2. CONTRACTOR REQUIREMENTS IN EXECUTING SOW ACTIVITIES

The following sections describe special contract requirements to which the TES contractors must adhere. Included are discussions on insurance, confidentiality, conflict of interest, chain-of-custody, and contractor files.

2.1 Insurance

At a minimum, each contractor is responsible for procuring and maintaining the following types of insurance:

- Workmen's compensation and occupational disease insurance in amounts to satisfy state law
- Employer's liability insurance in the minimum amount of $100,000 per occurrence
- Comprehensive general liability insurance for bodily injury, death or loss of or damage to property of third persons in the minimum amount of $1,000,000 per occurrence.

2.2 Confidentiality of Information

During performance of the contract, TES contractor staff may, by necessity, be entrusted with confidential information. All information received by EPA is subject to EPA's disclosure of information policy, 40 CFR Part 2, which is based on the Freedom of Information Act, 5 U.S.C. 552, and provisions for patents and rights as set forth by law. Generally, information is not confidential. However, if a TES contractor staff member should have access to information granted confidentiality by EPA, all TES contractor staff members shall follow Agency procedures set forth in 40 CFR Part 2 safeguarding such information. The contractor is not allowed to release information received from EPA unless approval is granted by the Contracting Officer.

In response to an initial submission of information with a request of confidentiality from a responsible party, private industry or any person or business, all EPA personnel and contractor employees should be aware of the proper procedures. All information requested by EPA for which a confidentiality claim is asserted must be submitted to the regional EPA office or EPA Headquarters. Any person submitting information to EPA may assert a business confidentiality claim by covering or placing on the information, at the time of submission to EPA, a cover sheet, stamped or typed legend, or other form of notice with language such as "TRADE SECRET" or "PROPRIETARY," or "COMPANY CONFIDENTIAL." The EPA office handling the information will make the initial determinations of whether the information is entitled to confidential treatment. Procedures for the validity of confidentiality claims and special rules governing certain information obtained under specific legislation, such as the Clean Water Act (CWA), are set forth in 40 CFR Part 2, Subpart B.

Contractor monthly reports may include company confidential information and should not be released to any one except EPA. These reports should be handled carefully (not left on desks in visible sight) and salary rates of employees, overhead rates, fringe benefits, and so forth should be kept confidential. In addition, RCRA confidential information must be kept in a secured area and proper procedures followed to make sure it is protected.

Provisions for rights in data and copyrights and patents are complex and will not be discussed here. If the question of rights with these issues should arise, the EPA Regional Counsel should be contacted to pursue the proper legal course.

2.3 Conflict of Interest

The TES contractor must notify the EPA CO of any actual, apparent or potential conflict of interest with regard to any work assigned prior to accepting that work. This includes both personal (TES prime and subcontractor staff) and organizational conflicts of interest.

The Regional Contacts will be responsible for coordinating with their Regional Counsel and notifying the PO of the Region's recommendation as to whether the contractor should be allowed to work on an assignment. The Regional Contact should obtain from the contractor a description of work previously performed and on this basis make a determination as to whether a conflict of interest exists. The Regional Contact should then notify the PO of this determination. The PO is responsible for reviewing the information provided by the Regional Contact and making a recommendation to the CO as to what action should be taken. The CO should review the recommendation made by the PO, make a determination of what should be done, and inform the contractor. If the CO decides that a potential conflict of interest exists, the work assignment can be transferred to the other zone TES contractor.

If an organizational conflict of interest appears to exist, the CO is responsible for determining whether the contractor should be permitted to perform the work. The CO will then notify the contractor Zone Program Manager (ZPM) in writing of this determination. If a personal conflict of interest appears to exist, the individual TES staff member who is affected will be disqualified from taking part in any way in the performance of the work.

The TES contractors are required to notify the EPA Regional Contact in advance whenever a suspected organizational or personal conflict of interest may exist. In cases where the conflict of interest does not become known until after performance of the work has begun, the contractor is required to notify the CO immediately and to discontinue work until notified by the CO of the appropriate action to be taken.

2.4 Chain-of-Custody and Document Control Procedures

Any work conducted by the TES contractor must follow established chain-of-custody and document control procedures. Detailed information pertaining to these procedures is available in NEIC Policies and Procedures, U.S. Environmental Protection Agency, National Enforcement Investigations Center (NEIC), Denver, Colorado, revised February 1983, EPA-330/9/78/001-R. The document will serve as the official EPA guidance for ensuring that the procedures are followed. In addition, regions may establish their own specific procedures for ensuring that the NEIC chain-of-custody and document control requirements are met.

2.5 Contractor Files

The TES contractor is required to maintain and make available to the CO, upon request, the books, records, documents and other evidence relating to the contract including personnel utilization records, site records, and accounting procedures. Such files shall be maintained for a period of ten years after conclusion of the contract.

In addition, the TES contractor is required to make available the records relating to any appeals, litigation, or the settlement of claims with third parties and which relate to this contract (i.e., cost recovery) until such appeals, litigation, or claims are disposed of.

CHAPTER III

CONTRACT MANAGEMENT: ORGANIZATION, ROLES, AND RESPONSIBILITIES

CHAPTER III

CONTRACT MANAGEMENT: ORGANIZATION, ROLES, AND RESPONSIBILITIES

KEY TOPICS

CHAPTER III

CONTRACT MANAGEMENT: ORGANIZATION, ROLES, AND RESPONSIBILITIES

EPA's internal organization for managing the TES contract is a critical element contributing to the Office of Waste Programs Enforcement's (OWPE) successful implementation of the program. In other chapters of this manual, details concerning the management and operating procedures that will be used to manage the TES contractors are discussed. In this chapter, the discussion focuses on the contract management structure and the roles, responsibilities, and qualifications of EPA Headquarters and regional personnel that will provide the framework and system for ensuring that the procedures are followed. Key interactions between Agency and TES contractor personnel are also highlighted.

The chapter is divided into four sections:

- Relationship Between EPA Headquarters and Regional Offices
- Contract Management Structure Within EPA Headquarters
- Contract Management Structure Within EPA Regional Offices
- TES Contractor Management Structure.

1. RELATIONSHIP BETWEEN EPA HEADQUARTERS AND REGIONAL OFFICES

Within the Agency, there are two levels of management that must be provided in order to successfully plan, execute, and control the work performed by the TAT contractors. These two components of EPA contract management consist of:

- Overall contracts management and program direction, centered in EPA Headquarters
- Technical oversight and project management, the responsibility of each EPA regional office.

These two levels of management work together to ensure that TES contract resources are used consistently with planned enforcement program goals and activities.

Exhibit III-1 provides an overview of the EPA Headquarters and regional management that will be used in the oversight of the three TES contracts. In addition, the exhibit depicts the key interactions between EPA and TES contractor management personnel. This section focuses on the relationship between Headquarters and the regions and will summarize the responsibilities of each. The contract management structure within EPA Headquarters and regional offices, and the roles and responsibilities of key Agency contracts management personnel are discussed in subsequent sections.

Within EPA Headquarters, OWPE is charged with overall management responsibility for the TES contracts. OWPE oversees total resource utilization of the TES contracts and coordinates implementation of the contracts through the EPA regional offices. Basically, Headquarters contract management monitors the consistency of the services to be performed as specified within the Statement of Work (SOW) of the three contracts. In addition, Headquarters must ensure that the TAT contractors adhere to all established Agency or other Federal regulations, procedures, and guidelines.

Completing the Headquarter's overall contract management structure is the regional contract management responsibilities of each individual EPA regional office. The EPA regional offices provide the mechanism to extend EPA Headquarters contract management into the field. This is accomplished by the direct oversight of the TES contractors' completion of and performance on various tasks, projects, and activities assigned to them.

Effective and efficient direction and utilization of contract resources depends on the establishment of a close working relationship among the Project Officer (PO), the Headquarters staff, and the Regional Contacts (RC). To successfully implement the program, the PO, RCs, and other appropriate EPA staff must rely on each other for input on matters such as:

- TES program policy and guidance development and implementation
- Resolution of contract management issues
- Project tracking and performance monitoring and evaluation
- Coordination with overall enforcement goals and objectives

EXHIBIT III-1

EPA-CONTRACTOR TES MANAGEMENT STRUCTURE
TES-II

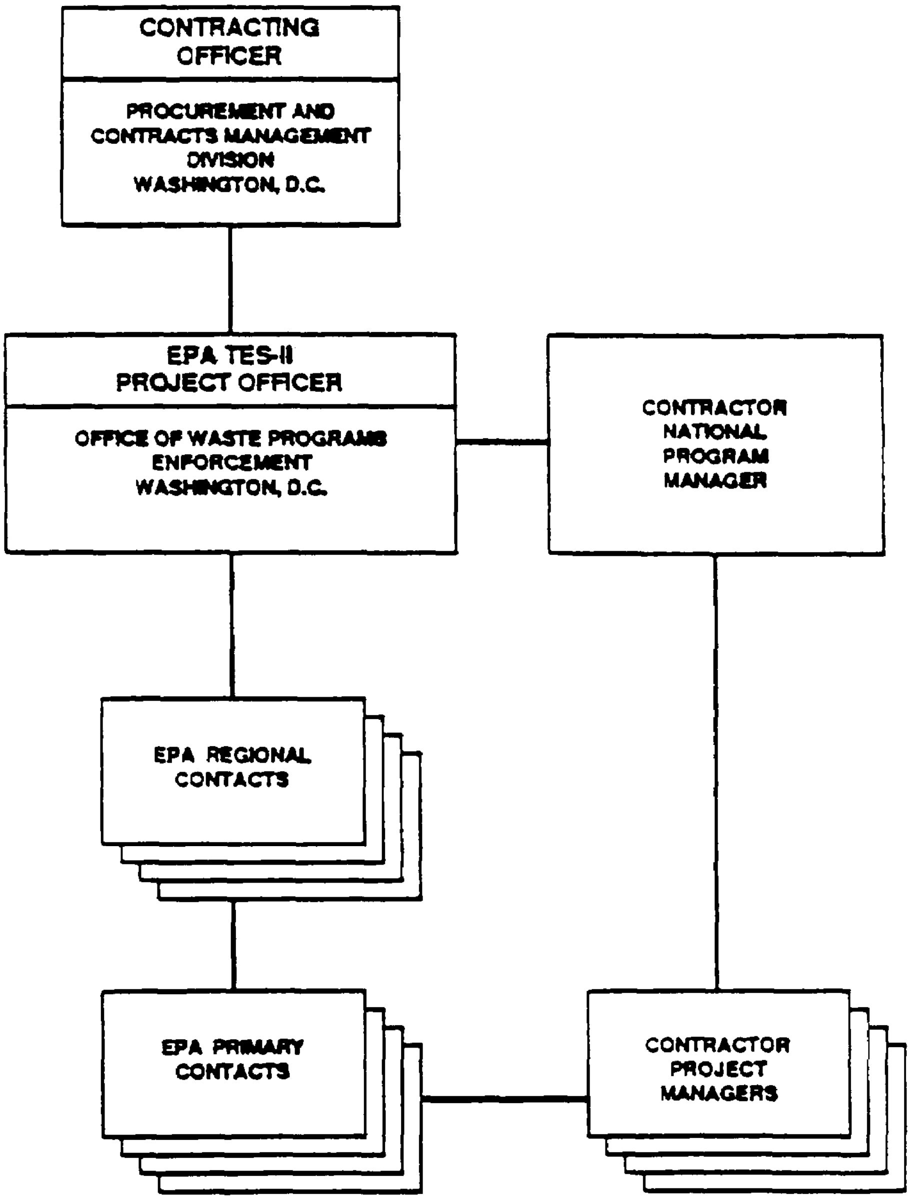
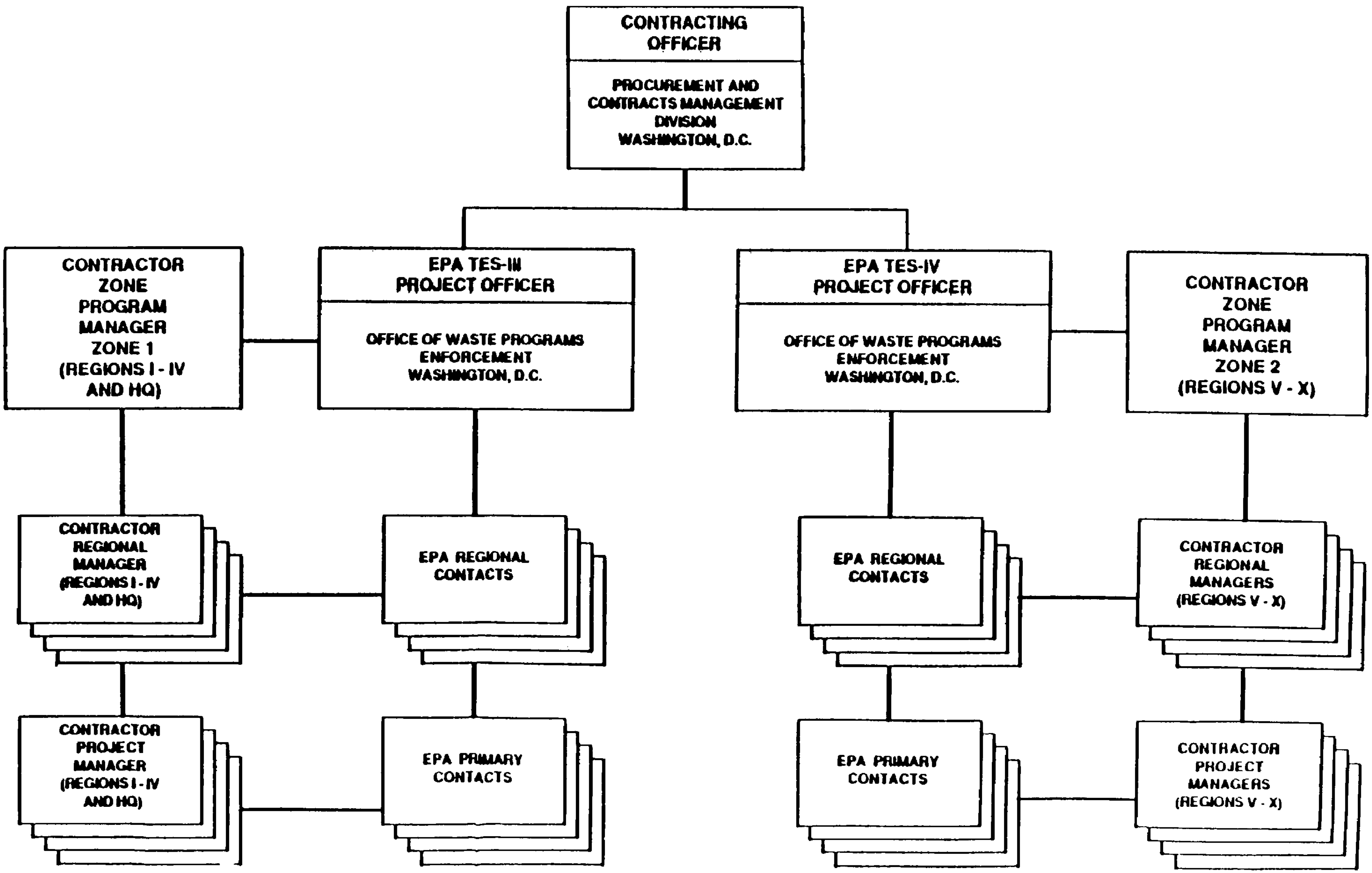


EXHIBIT III-1
(cont'd)
EPA-CONTRACTOR TES MANAGEMENT STRUCTURE
TES-III AND TES-IV



- Utilization of and balance between EPA resources and contract resources, including setting priorities.

The working relationship will be fostered through the frequent exchange of information both nationally and locally at periodic, scheduled meetings, as well as regular discussions among EPA personnel and, as required, discussions with contractor personnel.

The following three sections describe in greater detail the organization, roles, and responsibilities of the EPA Headquarters, regional, and TES contractor management personnel.

2. CONTRACT MANAGEMENT STRUCTURE WITHIN EPA HEADQUARTERS

2.1 TES Project Officers

As was shown in Exhibit III-1, each TES contract has a specific EPA Project Officer (PO). The POs will serve as the EPA officials with overall responsibility for managing and directing technical activities under the TES contracts. As such, the PO of each contract serves as the single point of contact for the Contracting Officer (CO) and the TES contractor. The PO will interface directly with the contractor National Program Manager (TES II), the contractor Zone Program Manager (TES III and IV) and the EPA Regional Contacts. Key responsibilities of the PO include the following:

- General oversight of program management, operations, direction, and coordination
- Coordination and initiation of funding requirements, exercising options, and recommendation of contract modifications
- Oversight of the cost, management, and overall technical performance of work assignments
- Recommendation of approval of work assignments (WAs) and amendments, subcontract/consultant consents and Work Plan approvals to the Contracting Officer (CO), and assessment of conflict of interest issues with the CO
- Assurance that WAs are within the scope of the contract
- Quality Assurance

- Oversight of hours and dollars available under the contract

- Preparation and submission of the Award Fee Report to the Performance Evaluation Board (PEB)

- Provision of training and guidance to Regional Contacts on proper use of the TES contracts

- Review and recommendation of approval of vouchers for payment

- Resolution of issues arising within and between Headquarters and regional offices

- Participation in the WA closeout process.

2.2 TES Contracting Officer

Corresponding to the program management responsibilities of the PO, the CO is the official within Headquarters with overall responsibility for ensuring that: (1) the TES contractors adhere to the articles and specifications of the contract; and (2) the TES contractors provide the necessary personnel, equipment, and services to provide EPA with the support specified in the SOW. The CO will coordinate with the PO and contractor National Program Manager (TES II) and Zone Program Managers (TES III and IV) to produce and maintain the TES contractual mechanism. As such, the TES CO is the only Federal representative authorized to make changes to the contract. Specific duties of the CO include the following:

- Overall administration of the contract (e.g., technical, schedule and cost)

- Issuance of all contract modifications (e.g., funding, options)

- Issuance of all Work Assignments, Amendments, Work Plan approvals, and subcontract/consultant consents

- Determination of conflicts of interest

- Authorization of any changes to the contract

- Closeout of contract.

3. CONTRACT MANAGEMENT STRUCTURE WITHIN EPA REGIONAL OFFICES

3.1 EPA Regional Contacts

The EPA regional offices are charged with the day-to-day oversight of the TES contractors' work in the field. In this sense, they will ensure that program policy, procedures, goals and objectives are carried out and met by the contractors with respect to specific assignments. Within each EPA regional office, RCs will have program management responsibilities for planning, executing and controlling the utilization of TES resources. The RC interfaces directly with the contractor Regional Manager (RM). Each RM for TES III and IV is physically located near the EPA regional office. Prior to award of specific WAs, the RC is responsible for the following:

- Assurance that WAs are within:
  - Scope of the contract
  - Budget of regional allocation
- Assurance that the WA SOWs are sufficiently detailed
- Assurance that the WA form is properly completed and signed
- Assurance that WA amendments are clearly and properly documented
- Assurance that the WA is a priority project
- Verification that WA level of effort, period of performance, and appropriation are correct.

Signature of the WA by the RC will indicate to the PO that all of the above steps have been taken.

After award of a WA, the RC is responsible for the following:

- Assurance that Work Plans are received and approved/disapproved on time (within the required 45-day period)
- Assurance that amendments to change cost, hours, period of performance, or the scope of work are justified, completed accurately and on time, and not after the fact

- Transmittal of cost, performance, schedule, subcontractor or conflict of interest problem to PO and CO

- Assurance that all deliverables are received and approved in a timely manner

- Review of all progress reports to ensure cost control within regional allocation and technical quality

- Assurance that contractor has sufficient knowledge of guidance (national or regional) to perform the task

- Provision of training and guidance to Work Assignment Managers (Primary Contacts)

- Coordination of regional award fee process

- Assurance that costs incurred and reported in financial reports are correct

- Service as regional representative to the PO and CO on all WA issues

- Provision of other information required by the PO or CO

- Assistance in closeout process.

If the RC plans to be out of the office and unavailable to perform contract management functions, the RC's immediate supervisor (typically a Section Chief) can be designated to act on behalf of the RC for a discrete period of time. The Regional Division Director shall prepare a memorandum stating the temporary designation and submit it to the PO and CO; this memo shall be countersigned by the CO.

3.2 EPA Primary Contacts

The PC serves as the Work Assignment Manager. Specific duties and responsibilities of the PC prior to issuance of the WA include the following:

- Definition and preparation of the SOW for the WA including guidance available, technical approach, and report format

- Assurance that the scope of the WA is within the contract's SOW

- Development of the Government's estimate of the level-of-effort (LOE)

- Identification of the applicable appropriation for funding the WA

- Development and identification of the WAs

  - Period of Performance
  - Project schedule and milestones
  - Travel requirements
  - Government property or equipment needs
  - Deliverables

- Determination of priority of the WA in conjunction with the Section Chief

After each WA has been issued, the PC is responsible for the following:

- Recommendation of approval or disapproval of Work Plans, addressing both technical approach, personnel qualifications, and cost aspects

- Oversight of performance of the WA

- Provision of necessary technical direction (within limits)

- Daily or weekly contact with PM to discuss progress and issues

- Review and recommendation of approval of costs shown in the monthly report to ensure that personnel hours, travel costs, and other major expenditures are accurate

- Review of all progress reports to ensure that technical progress, as reported, is accurate

- Report of any cost, performance, schedule, subcontractor or conflict of interest problems to RC

- Review and approval or disapproval of all WA deliverables to assure they are sufficiently detailed

- Provision of award fee evaluations to RC

- Provision of any other information required by RC, PO or CO

- Discussion of any uncertainties encountered with RC

- Assistance in closeout process.

4. TES CONTRACTOR MANAGEMENT STRUCTURE

The TES II contractor provides enforcement support services on a nationwide basis. The recently awarded TES III and TES IV contracts are zone-based programs in which each zone's contractor is responsible for providing assistance in discrete areas of the country. The TES III contractor is responsible for Zone 1 (Regions I, II, III, and IV, plus Headquarters support), and the TES IV contractor is responsible for Zone 2 (Regions V, VI, VII, VIII, IX, and X). For the nationwide TES contract, a key management position, National Program Manager (NPM), is required. For the two zone-based contracts, a key management position, Zone Program Manager (ZPM), is required for each of the TES contractor's internal organization. For all three contracts, two additional management positions are required: (1) a Regional Manager (RM), and (2) a Contractor Project Manager (CPM). The roles and responsibilities of each of these are highlighted below.

4.1 TES II National Program Manager

In the TES II nationwide contract, the NPM will be the single point of contact for coordination with the PO, and will be responsible for the organization and completion of all work assignments performed under the contract. Specific responsibilities of the NPM are similar to those of the ZPM, described in the next section.

4.2 TES III and IV Zone Program Managers

In the two zone-based contracts (TES III and IV), the ZPM will be the single point of contact for coordination with the PO, and will be responsible for the planning and execution of all tasks performed under the contract. Specific responsibilities of the ZPM include the following:

- Provision of services to EPA as specified in the contract at the level of effort and rates agreed to in the contract

- Management of the RMs in each region

- Management of all team subcontractors

- Provision of overall supervision and administrative support to the RMs
- Management of all consultants and other subcontracts
- Determination of regional responsibilities for WAs
- Monitoring of incurrence of costs and expenditures of funds throughout the duration of the contract
- Verification of Work Plans
- Development of procedures and forms as required for execution of the program, uniformity of recordkeeping, and project management documentation among the WAs
- Preparation and submission of reports as specified in the contract schedule and establishment of procedures for the preparation and submission of required reports by the RM
- Maintenance of separate accounting for all assignments designated as special projects, and separate accounting for work performed in conjunction with assignments to support the regions during cleanup operations
- Provision of a detailed explanation of how indirect rates are determined for use as documentation in cost recovery litigation
- Implementation of procedures to ensure that all reports prepared by the RM or CPM are of high quality and meet the content and format requirements of the contract
- Discussion of contract status with the PO and CO on a bi-weekly basis
- Accompaniment with the PO during each EPA regional management review of regional TES activities
- Assurance of adherence to channels of communication in accordance with the project organizational links
- Compliance with all requirements for control of property as illustrated by Part 405 of the Federal Acquisition Regulations

- Performance of management reviews and quality assurance audits

- Provision of Award Fee Summary Reports.

4.3 Contractor Regional Managers

Contractor Regional Managers (RMs) are those personnel who have overall responsibility for the execution of all work assignments within their assigned region. RMs are in constant contact and work closely with the RC, and also with the various PCs within the specific region. Specific responsibilities of the RM include the following:

- Determination of appropriate team firm to perform each WA

- Provision of technical review of all deliverables

- Assurance that level-of-effort and costs are within those allocated for each WA

- Provision of information to the RC on a regular basis concerning project progress, problems and other important issues

- Coordination of monthly progress reports on WAs

- Oversight of all team firm activities

- Preparation of regional award fee summaries

- Coordination of award fee process, in conjunction with the RC and PCs

- Provision of solutions to minor problems and transmission of information on the existence of major problems to RC and ZPM

- Consultation with RC to plan future work assignments.

4.4 Contractor Project Managers

Contractor Project Managers (CPMs) are the personnel responsible for the performance of individual work assignments. CPMs work closely with the EPA PCs (Work Assignment Managers) to coordinate the direction and activities within the WA. Specific responsibilities of the CPM include the following:

- Preparation of work plans, and assurance that the work plan adequately addresses the objectives of the work scope for the WA
- Preparation of monthly progress reports
- Review and approval of draft costs before they are entered into monthly reports
- Development of WA budget
- Preparation of award fee evaluation forms
- Coordination with contractor RM on the following:
  - Deliverables/Quality assurance and control
  - Technical review and comments
  - Problems
  - Revisions and amendments to the WA

Preparation of WA completion report.

CHAPTER IV

INITIATING AND MANAGING TES CONTRACTOR SERVICES

CHAPTER IV

INITIATING AND MANAGING TES CONTRACTOR SERVICES

KEY TOPICS

CHAPTER IV

INITIATING AND MANAGING TES CONTRACTOR SERVICES

All work under the TES contracts is performed through work assignments (WAs) issued to the TES contractors by the EPA Contracting Officer (CO). The process for initiating and managing TES WAs is illustrated in Exhibit IV-1. This process typically involves three stages or categories of activities:

- Work Assignment Initiation
- Work Assignment Management
- Work Assignment Completion and Close-Out.

This chapter provides a detailed description of each stage of the work assignment process including an explanation of each form or report used in the initiation and completion of services. It also provides a description of EPA and contractor roles and responsibilities involved in initiating and managing TES work assignments.

1. WORK ASSIGNMENT INITIATION

The prospective TES user will reach a point during the execution of his or her day-to-day hazardous waste enforcement activities where it will be obvious that resources and skills available inside EPA are either insufficient or unavailable to continue the enforcement actions underway. This is the point at which TES contractor services are needed.

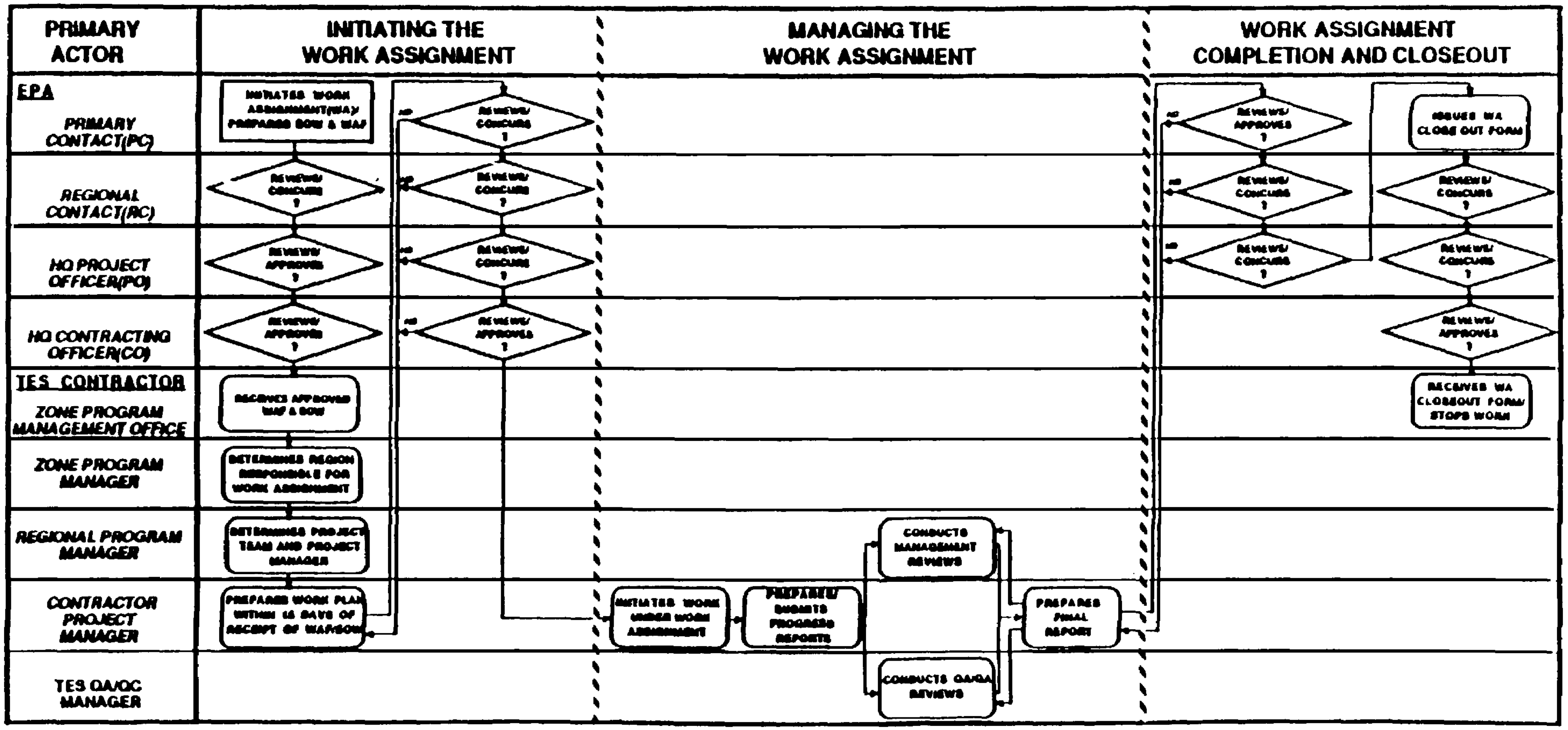
When this occurs, the EPA Primary Contact (PC) is responsible for initiating the work assignment. Two documents serve as the principal mechanism for obtaining these services and for initiating the work assignment:

- Statement of Work (SOW)
- Work Assignment Form (WAF).

Steps for initiating the work assignment focus on the above documents and involve:

(1) Preparation of the SOW
(2) Preparation of the WAF
(3) Review and approval of the WAF and the SOW
(4) Preparation of the TES Contractor Work Plan.

EXHIBIT IV-1
THE WORK ASSIGNMENT PROCESS



Details of the steps to be followed in initiating a TES work assignment are described below.

1.1 Preparation of the Statement of Work

The first step in initiating a WA is to develop an SOW. This SOW should describe in detail the specific work that needs to be performed. Preparation of the SOW is the responsibility of the PC. To assist the PC in preparing the SOWs, several examples are provided in the Appendix accompanying this manual. These examples are intended to illustrate the way in which SOWs should be written -- the format to use, the types of information to include, the style of presentation, the level of detail, and so forth.

In preparing the SOW, the PC should remember to always include the following items:

1. Introduction/background (1-2 paragraphs)

2. Clear statement of enforcement need(s) and regulatory action being supported (2-3 sentences)

3. Description of specific tasks to be performed (1 short paragraph per task)

4. Deliverables required (reports, briefings, letters, etc.)

5. Clear, realistic schedule for task completion and deliverable due dates

6. Anticipated Contractor travel requirements and meeting attendance

7. Technical level-of-effort hours estimate (see Exhibits IV-2 and IV-3 for tables indicating level of effort for all enforcement task types. Also see Attachment B for detailed task descriptions and estimated levels of effort.

The PC should use the level of effort estimates in Exhibits IV-2 and IV-3 only as a <u>guide</u> in developing SOW estimates. In many cases, these estimates were derived from small samples and, therefore, may not be typical. Individual needs and situations will vary considerably across WAs, so additional factors always need to be assessed when making level-of-effort estimates.

EXHIBIT IV-2
LEVEL OF EFFORT FOR CERCLA AND RCRA
ENFORCEMENT TASKS UNDER TES III (March 1987)

Task No.	Task Type	No. of Tasks	Total Labor Hours (TLH) High	Low	Average
1	Responsible Party Search	14	350	250	280
3	Design of Enforcement Studies	N/A	N/A	N/A	N/A
5[a]	Title Search	5	150	40	76
10[a]	Financial Assessment	2	375	320	347
15[a]	Records Compilation/ Responsible Party Search	8	1,580	130	603
15[a]	Records Compilation/ Other	1	2,063	2,063	2,063
17	Data Management	4	2,200	750	1,237
20	Health/Environmental Assessments	5	440	200	300
25	Field Work	2	2,814	728	1,771
30	Hydrogeologic/ Geologic Studies	N/A	N/A	N/A	N/A
40	Special Studies	N/A	N/A	N/A	N/A
45	Enforcement Feasi-bility Studies	N/A	N/A	N/A	N/A
46	Focused Feasibility Studies	N/A	N/A	N/A	N/A
50[b]	Sample Analysis	4	1,558	313	568
55[b]	Biological Testing	N/A	N/A	N/A	N/A
60	Technical Review of Documents	17	1,000	71	433
65	Expert Witness/ Consultant	11	228	10	68
70	Interrogatory Preparation	N/A	N/A	N/A	N/A
75	Evidence Storage/ Preservation	N/A	N/A	N/A	N/A
80	Compliance Monitoring/ Review of Responsible Party Plans	13	1,572	64	304

N/A = Not Available

[a]Enforcement Support Services
[b]Special Laboratory Services

EXHIBIT IV-2 (Cont.)
TASKS UNDER TES III (Cont.)

Task No.	Task Type	No. of Tasks	Total Labor Hours (TLH) High	Low	Average
81	Oversight of Responsible Party Actions	N/A	N/A	N/A	N/A
82	RCRA Inspection Activities	N/A	N/A	N/A	N/A
	. Sampling Activities	N/A	N/A	N/A	N/A
	. Compliance Evaluation Inspection	N/A	N/A	N/A	N/A
	. Comprehensive Monitoring Evaluation	N/A	N/A	N/A	N/A
	. Case Development Inspection	N/A	N/A	N/A	N/A
83	Review, Analysis, and Evaluation of RCRA Facilities Compliance	N/A	N/A	N/A	N/A
	. Facility Plan Reviews	N/A	N/A	N/A	N/A
	. Evaluation of Compliance	N/A	N/A	N/A	N/A
	. Enforcement Guidance/Support Services	N/A	N/A	N/A	N/A
85	Evidence Audits	N/A	N/A	N/A	N/A
90	Cost Recovery Documentation	1	60	60	60
95	Community Relations	3	1,050	122	470
96	Quality Assurance	N/A	N/A	N/A	N/A
97	Policy & Program Support	3	480	80	280
98	Training	N/A	N/A	N/A	N/A

N/A = Not Available

[a]Enforcement Support Services
[b]Special Laboratory Services

EXHIBIT IV-3
LEVEL OF EFFORT FOR CERCLA AND RCRA
ENFORCEMENT TASKS UNDER TES IV (March 1987)

Task No.	Task Type	No. of Tasks	Total Labor Hours (TLH) High	Low	Average
1	Responsible Party Search	40	1,995	80	303
3	Design of Enforcement Studies	N/A	N/A	N/A	N/A
5[a]	Title Search	2	70	30	50
10[a]	Financial Assessment	3	375	160	252
15[a]	Records Compilation/ Responsible Party Search	10	1,447	35	723
15[a]	Records Compilation/ Other	N/A	N/A	N/A	N/A
17	Data Management	N/A	N/A	N/A	N/A
20	Health/Environmental Assessments	N/A	N/A	N/A	N/A
25	Field Work	N/A	N/A	N/A	N/A
30	Hydrogeologic/ Geologic Studies	3	379	50	198
40	Special Studies	4	537	200	362
45	Enforcement Feasi- bility Studies	1	1,980	1,980	1,980
46	Focused Feasibility Studies	N/A	N/A	N/A	N/A
50[b]	Sample Analysis	2	1,630	126	878
55[b]	Biological Testing	N/A	N/A	N/A	N/A
60	Technical Review of Documents	9	4,923	109	904
65	Expert Witness/ Consultant	8	555	35	235
70	Interrogatory Preparation	N/A	N/A	N/A	N/A
75	Evidence Storage/ Preservation	4	15,884	165	235
80	Compliance Monitoring/ Review of Responsible Party Plans	13	1,572	64	304

N/A = Not Available

[a]Enforcement Support Services
[b]Special Laboratory Services

EXHIBIT IV-3 (Cont.)
TASKS UNDER TES IV (Cont.)

Task No.	Task Type	No. of Tasks	Total Labor Hours (TLH) High	Low	Average
81	Oversight of Responsible Party Actions	N/A	N/A	N/A	N/A
82	RCRA Inspection Activities	N/A	N/A	N/A	N/A
	. Sampling Activities	N/A	N/A	N/A	N/A
	. Compliance Evaluation Inspection	N/A	N/A	N/A	N/A
	. Comprehensive Monitoring Evaluation	N/A	N/A	N/A	N/A
	. Case Development Inspection	N/A	N/A	N/A	N/A
83	Review, Analysis, and Evaluation of RCRA Facilities Compliance	N/A	N/A	N/A	N/A
	. Facility Plan Reviews	N/A	N/A	N/A	N/A
	. Evaluation of Compliance	N/A	N/A	N/A	N/A
	. Enforcement Guidance/Support Services	N/A	N/A	N/A	N/A
85	Evidence Audits	N/A	N/A	N/A	N/A
90	Cost Recovery Documentation	3	1,208	232	632
95	Community Relations	6	360	105	198
96	Quality Assurance	N/A	N/A	N/A	N/A
97	Policy & Program Support	N/A	N/A	N/A	N/A
98	Training	N/A	N/A	N/A	N/A

N/A = Not Available

[a]Enforcement Support Services
[b]Special Laboratory Services

1.2 Preparation of the Work Assignment Form (WAF)

Following development of the SOW, the next step in initiating the WA is to prepare the WAF, which includes background data, the period of performance, time and cost estimates, and other relevant information.

A copy of the WAF is shown in Exhibit IV-4. The EPA Regional Contact (RC) has a supply of this form, which is designed to be used not only for initial requests, but also for work plan approvals, work assignment amendments, and final report approval/assignment close-outs. The PC should complete each of the elements on the WAF, as explained below:

- APPROPRIATION: The regulatory action to be supported and the source of funding (i.e., CERCLA, RCRA, or other), and the funding account number. For CERCLA, Headquarters initiates Purchase Requisitions and will place the account number there. For RCRA, each region buys into the contract and the RC should know what the account number is. RCRA also uses Headquarters money, so it should be specified whether Headquarters or regional monies are being used.

  TES NO.: The number of the TES contract (i.e., II, III, IV), the specific contract number, and the name of the prime contractor responsible for the completion of the work assignment.

TES No.	Contract No.	Prime Contractor
II	68-01-7073	Planning Research Corporation
III	68-01-7331	Camp, Dresser & McKee, Inc.
IV	68-01-7351	Jacobs Engineering Group, Inc.

- WORK ASSIGNMENT NO.: The WAF number (i.e., original number to be assigned by the PO), its status (i.e., original or amendment), amendment number (to be assigned by the RC), and the WAF priority (i.e., normal, expedite). If this form is to be used for a work assignment amendment, it should also contain the amendment number. If the schedule in the statement of work is such that the normal approval process can occur before work must begin, mark the "normal" box on the form. If work must begin ahead of formal work plan approval, mark the "expedited" box. In either case, work cannot begin until the Contracting Officer approves the work assignment request.

Exhibit IV-4

ENVIRONMENTAL PROTECTION AGENCY

Technical Enforcement Support at Hazardous Waste Sites

APPROPRIATION: ☐ CERCLA ☐ RCRA ☐ Other

Funding Acct. No. ______

TES NO. ______

Contract No. ______

Prime Contractor Name ______

WORK ASSIGNMENT NO. ______

☐ Original

☐ Amendment No. ______

Priority: ☐ Normal ☐ Expedite*

SITE/FACILITY: ______
or Project Name

______ Site/Facility Location (City or County) ______ State ______ Region/HQ

NPL Site: ☐ Final or Proposed List ☐ No

Site Acct. #: ______ SCAP Activity Link: ______

RCRA Facility: ☐ Yes ☐ No Facility ID# ______

PURPOSE:

☐ Initiate New Work Assignment ☐ Work Plan Approval** ☐ Disapprove Work Plan (Contractor will immediately stop work)

☐ Work Plan Revision: (☐ SOW ☐ Cost/Hours) ☐ Closeout Work Assignment (All final deliverables received)

STATEMENT OF WORK SUMMARY (SOW) (Attach a *Detailed* SOW) (See Reporting Requirements):

Task Type ______ Task No.: ______

(Must identify task type and number according to TES User's Guide to show activity is within the overall TES contract SOW)

Summary/Comments:

BASE PERIOD	LOE	Cost/Fee	OPTION PERIOD (Authorized only if contract option is exercised)	LOE	Cost/Fee
Previously Approved	______	______	Previously Approved	______	______
This Action	______	______	This Action	______	______
Total	______	______	Total	______	______

TES II: Use Option Column
TES III & IV: Base period ends 9/30/87. Any work required after that date should appear in option column.

PERIOD OF PERFORMANCE (Base)

From: Effective date below

To: ______

(closeout date not to exceed September 30, 1987)

PERIOD OF PERFORMANCE (Option)

From: ______

To: ______ (Closeout date)

(Do not include clerical or Expert Witness hours in the LOE estimate. Expert Witness costs are considered "Other Direct Costs." Estimate the Expert Witness hours in the attached Scope of Work.)

No. of Pages to Follow ______ (Including SOW)

Reference Info.: ☐ Attached* ☐ Transmitted Separately ☐ Pickup From ______

REPORTING REQUIREMENTS: ☐ Briefing(s) ☐ Letter Report ☐ Draft Report ☐ Final Report*** ☐ Other

Deliverables are to be marked ENFORCEMENT CONFIDENTIAL: ☐ Yes ☐ No

Reporting requirements and deliverables may differ for each TES contract. Include in the SOW a schedule for deliverables. If the number of reports required for your deliverables differs from the contract's normal requirement, request that in your SOW.

INITIATOR: ______ ______
Primary Contact Date

______
Address

Phone no. ______ ______
FTS Off-NET

CONCURRENCE: ______ ______
Regional Contact Date

APPROVAL: ______ ______
Project Officer (HQ TES P.O.) Date

______ ______
Contracting Officer Date (Effective Date)

CONTRACTOR ACKNOWLEDGEMENT OF RECEIPT:

______ ______
Signature and Title Date

*Justification required in comment section. **Required within 45 days of effective date or work stops. ***30 day minimum required between draft and final report.

Revised: Dec. 1986

Sheet 1 White – Contracting Officer Copy (Washington, D.C.), Sheet 2 Blue – Project Office Copy (Washington, D.C.), Sheet 3 Green – Contractor Copy
Sheet 4 Yellow – Acknowledge Copy, Sheet 5 Pink – Finance Office/RTP Xerox Copies to: Regional Contact, Primary Contact, and Regional Coordinator

For normal requests, the work plan submitted by the Contractor must also be approved by the Contracting Officer before work can begin. (Based on prior experience with TES, more than 90 percent of work assignments can be handled in the normal mode.) Exceptions are usually limited to such occurrences as unexpected court directives, unexpected need for expert witnesses, and emergency situations requiring quick responses.

- SITE/FACILITY: The project name, the location of the specific site, CERCLA only: (its NPL status, site account number*, SCAP Activity Link**); RCRA only: (RCRA facility and its identification number)

- PURPOSE: The particular use of the form (i.e., initiating a new WA; work plan approval or disapproval; work plan revision; WA closeout).

- STATEMENT OF WORK: The task type, task type number, and a brief summary of the scope of work. A detailed SOW must be attached. Example SOWs are provided in the Appendix (Volume II).

- BASE PERIOD: The previously approved and estimated level-of-effort hours and costs associated with the work assignment in the base period. If work is needed in the base and option periods, use both sections.base and options.

---

* The site account number is a four-digit code used for CERCLA sites only. The first digit represents the region in which the site is located; the second digit specifies the type of activity (see Attachment C for a list of the six different enforcement activity types); and the last two digits represent the EPA site-spill identifier (S/S ID). The PC should consult the Superfund Site ID System (SSIDS) to identify specific S/S IDs.

** SCAP activity links are four character codes (however, only the first three characters are used for the WAF) used to place activities into particular groups of remedial, removal, and enforcement related categories. A list of these activity links is presented in Attachment D. The PC should consult this list when completing this section of the WAF.

- OPTION PERIOD: The previously approved and estimated level-of-effort hours and costs associated with the work assignment needed in the option period. This block may be completed if the contract is in the base period of performance and work will need to continue into the option period if the option is exercised.

- PERIOD OF PERFORMANCE: The effective starting date and the estimated close-out date of services in the base and option period.

- NO. OF PAGES TO FOLLOW: Any relevant reference information that may be submitted along with the WAF including a detailed SOW.

- REPORTING REQUIREMENTS: The type of end product desired for the work assignment, and indicates whether the deliverables are to be marked "Enforcement Confidential."

- SIGNATURE BLOCK: The WAF is initiated and signed by the PC and then reviewed and signed by the Regional Contact (RC). It is then submitted to EPA Headquarters for final approval and signature by the PO and CO. The final signature is that of the TES contractor, acknowledging receipt of the WAF.

1.3 Work Assignment Review and Approval

All necessary signatures are entered on the WAF prior to review and approval by the CO. The PC's signature verifies that appropriate technical direction is included and the assignment originated with the PC. The RC's signature asserts that the work assignment is within the scope of the contract, that it is a priority project, and that it is within the region's allocation budget.

Once the WAF has been prepared and signed by the PC, it is forwarded to the RC for concurrence. The RC reviews the WAF for accuracy and level of detail and completeness, signs it, and forwards it to EPA Headquarters for further review. The WAF is reviewed and approved by the PO who signs it and forwards it to the CO. The WAF receives final approval by the CO who signs it and issues it to the Zone Program Management Office (ZPMO).

If, at any time during the review and approval process, the RC, PO or CO have comments or discover errors or deficiencies, these deficiencies should be discussed with the RC or PC and resolved prior to issuance of the work assignment to the TES contractor. Appropriate copies of the WAF should be retained by all those involved in the approval process. Once the work assignment is approved, a signed copy will be issued to each party.

Detailed descriptions of the roles and responsibilities of EPA management personnel are outlined in Chapter III of this manual.

Upon receipt of the WAF by the Zone Program Manager (ZPM), it should be signed and a copy sent to the CO. In general, the TES contractor should be willing to accept any assignment within the bounds of the TES contract SOW, unless there is a conflict of interest.

If the ZPM rejects the WA, the WAF should be returned to the CO with an explanation of the reasons for rejection. The CO, PO, and ZPM should then confer to resolve the situation. If conflict exists, the WA will be issued to the other zone contractor or if a resolution is reached, an amended WAF can be issued and the work assignment process continued. (A detailed description of the work assignment amendment process is addressed in Section 2.2 of this chapter).

1.4 TES Contractor Work Plan Preparation, Review and Approval

Once the work assignment has been accepted by the contractor, the TES Contractor Project Manager (CPM) is required to prepare within 15 days a detailed work plan describing how the contractor plans to accomplish all the activities and tasks outlined in the SOW. In some cases, it may be that less than 15 days will be considered necessary for preparing a work plan. Frequently occurring types of tasks, for example, may require less preparation time. The PC should encourage the CPM, in those situations, to expedite the preparation of the work plan in order to save time and money. Examples of generic work plans are provided in the Appendix.

As a minimum, each work plan should address the following elements:

- Introduction and synopsis of SOW
- Project approach including reference to procedures that will be used
- Deliverables (interim and final)
- Work schedule including major milestones and deliverables

- Personnel (names, experience, training and P-Level)

- Justification for using subcontractors (other than Team Subcontractors) or consultants

- Costs and scheduling for getting subcontractors or consultants on board

- Exceptions to the assignment, anticipated problems, special requirements

- Quality assurance considerations

- Cost estimate.

The completed work plan is then submitted to the PC for review and approval. The EPA approval process for the work plan is the same as that for the WAF. If approved, the PC attaches a WAF, checks the work plan approval box (located in the PURPOSE section of the WAF), signs it, and forwards the package to the RC. The RC reviews and concurs with the work plan, signs the WAF, and forwards the package to the TES PO at EPA Headquarters. If the RC has a problem with the work plan, the PC should be notified and the problem resolved, through consultation with the RC and CPM.

In reviewing the work plan, the PC and RC should examine several aspects to make sure that:

- The SOW has been satisfactorily addressed

  - All the required tasks have been fully described

  - All the required deliverables have been described

  - The schedule for completing the job is adequate and realistic

- The distribution of hours and costs is reasonable and clear

  - P-Level hours (i.e., P-4, P-3, etc.) are provided and are appropriate for the work required

  - Travel costs are provided including the number of trips and individuals making those trips

  - Other direct costs are shown

- If equipment is to be purchased or leased, Contracting Officer approval has been obtained

- A lease-purchase analysis has been completed for large ticket items and the results are included in the work plan

- Anticipated problems or exceptions are clearly stated and documented

- If laboratory analyses are required but cannot be performed by EPA's Contract Laboratory Program (CLP), the justification for not using CLP has been explained (e.g., too short a time frame; capacity problem; etc.)

- Quality assurance procedures are described or referenced

- Personnel have appropriate and necessary experience and qualifications to perform the work.

Upon receipt of the work plan and the WAF, the PO and CO should review the work plan and either approve or reject it. In some cases approval may be conditional, pending changes in certain areas. This should be indicated on the WAF. The PO or CO will notify the RC and PC of any problems that need to be addressed in order to make the work plan acceptable and coordinate with them to resolve these problems. In those cases where changes to the work plan are necessary, the PC should discuss the suggested revisions with the contractor outlining the concerns of the CO and/or PO. Upon agreement on the necessary modifications, the contractor should prepare and submit a revised work plan to the PC addressing the problems noted.

Once the PO and CO approve the work plan, they should check the appropriate box(es) in the PURPOSE section of the WAF (i.e., Work Plan Approval, Work Plan Revision), sign the WAF, and forward a copy to the ZPMO verifying approval.

2. MANAGING THE WORK ASSIGNMENT

Under the TES contracts, the contractors are permitted to commence work upon completion and submittal of a detailed work plan to EPA.* If, however, the work plan is

* For expedited work assignments, the contractor can begin work immediately upon receipt of the WAF, even before the work plan has been prepared.

disapproved, or if approval is not granted within 45 days, the contractor is required to stop immediately all work pertaining to the work assignment.

2.1 TES Contractor Deliverables

During the active life of each work assignment, the contractor is required to submit monthly and/or biweekly progress reports to the PC, RC, PO, and CO. These reports will contain information pertaining to project status, schedule adherence, total budgeted costs and labor hours and cumulative costs and labor hours expended.

Effective and frequent communication between the TES CPM and the PC will help to reduce the occurrence of cost or schedule problems. Deliverables submitted by the contractor are the formal means of communication but are not intended to be the only source of communication between the parties.

Contractor progress reports will be discussed in detail in Chapter VI of this manual.

2.2 Work Assignment Amendments

If, during the course of work, the contractor finds it necessary to modify the work assignment SOW, an amendment to the work assignment should be prepared by the PC, concurred with by the RC, and forwarded to the PO and CO for final approval and issuance.

The process begins with the contractor notifying the PC of the proposed modifications. The PC should review the proposed modifications and either approve or disapprove them. If not approved, the PC should contact the contractor, explain why the modifications were not approved, and attempt to resolve the discrepancies. Upon agreement, the PC should prepare a WAF, completing the appropriate sections to reflect its use as an amendment to the work assignment, and forward it to the RC for approval. The RC, upon approval, should sign the WAF and forward it to EPA Headquarters for final review and approval.

If the PO or CO has any problems with the proposed modifications, the RC or PC should be contacted to discuss and resolve them.

When an agreement is reached, the PO should sign the WAF incorporating and authorizing all the approved modifications and submit it to the CO for approval. The CO should then sign the amendment and issue it to the contractor. Appropriate copies of the WAF should be retained by all parties involved in the approval process, as designated on the WAF.

3. WORK ASSIGNMENT COMPLETION AND CLOSEOUT

Upon completion of a work assignment, the contractor is required to prepare a written final report and submit it to the PC for approval and then to the RC and PO for review and concurrence. Since work assignments vary in nature, there is no standardized guideline for the final report. It is important, however, that it be clear and concise, and address all areas detailed in the SOW.

Upon approval of the final report, the PC will prepare a WAF, indicating its use for work assignment closeout, and submit it to the RC for review. The RC, upon approval of the final report, should sign the WAF, and forward it to the PO for approval. Upon approval of the final report, the PO should sign the WAF and submit it to the CO for signature. The CO will then issue the WAF to the contractor.

Should the final report be disapproved or approved subject to specific changes, this will be indicated on the WAF and communicated to the contractor. It is important that written feedback, whether positive or negative, occur for each work assignment at completion. It is also important that verbal communication occur during the life of each work assignment in order for the contractor to be responsive to any apparent problems.

CHAPTER V

TES CONTRACTOR QUALITY ASSURANCE PROGRAMS

CHAPTER V

TES CONTRACTOR QUALITY ASSURANCE PROGRAMS

KEY TOPICS

CHAPTER V

TES CONTRACTOR QUALITY ASSURANCE PROGRAMS

Contractor activities under the Technical Enforcement Support (TES) contracts must meet several criteria for acceptability. To ensure that these acceptability objectives are met, each TES contractor must develop and implement a quality assurance (QA) program for all specific activities conducted by the prime contractor and the associated subcontractors.

The general objective of these TES QA programs is to ensure the adequacy of data, adherence to contractual requirements, and compliance with appropriate laws, regulations and policies. Data collected must be valid and adequate to support the intended enforcement activity. Additionally, any interpretations of the collected data must be justifiable and retraceable. When data are finally presented for use, they must address their intended use while maintaining objectivity.

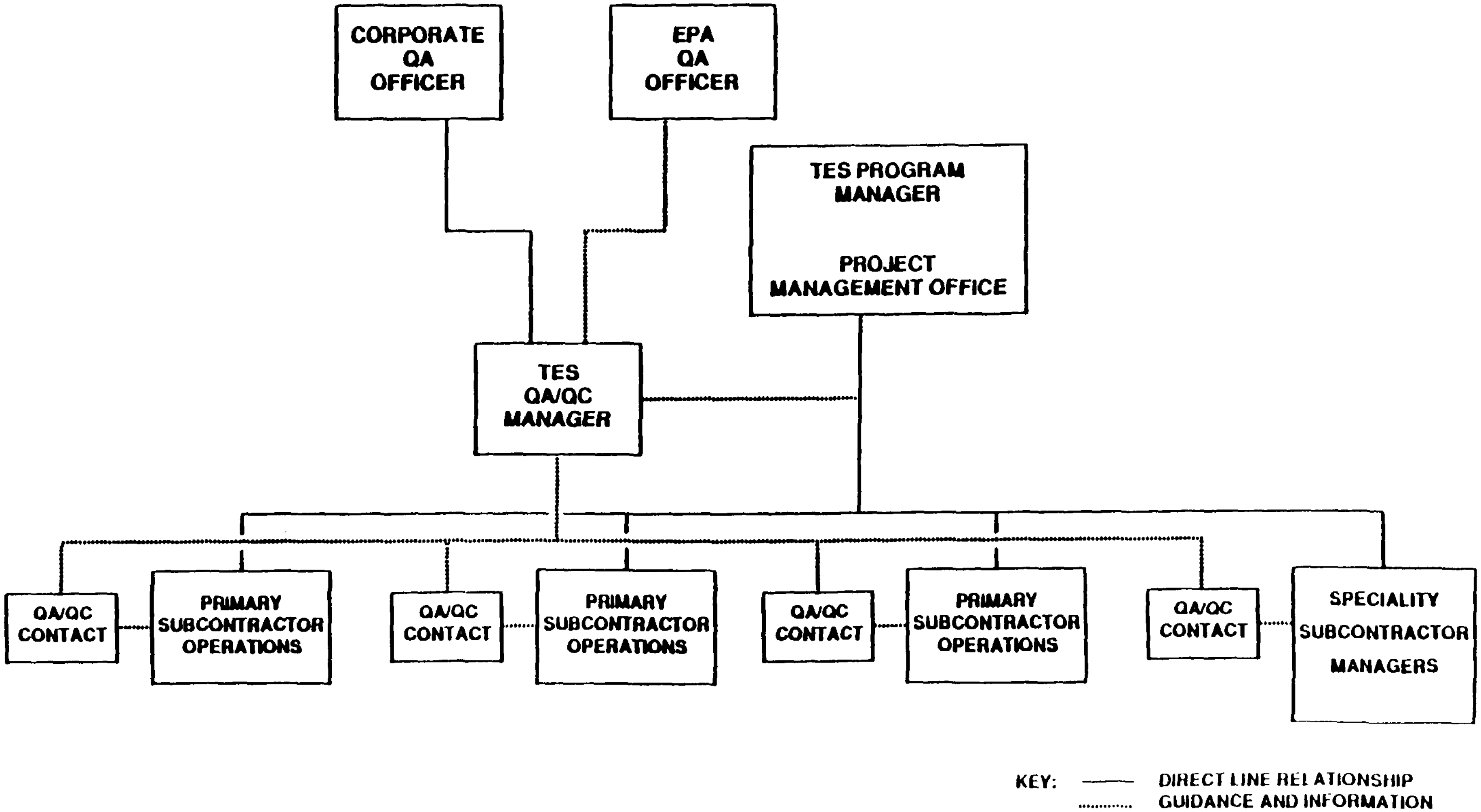
Contractors must adhere to all requirements specified in the contract. Procedures specified for the collection and handling of information must be documented and followed. Additionally, budgets and schedules must be maintained.

Finally, contractor activities must comply with all applicable Federal laws such as RCRA and CERCLA, state and local laws, and appropriate regulations and policies developed by EPA and other Federal agencies.

1. QUALITY ASSURANCE/QUALITY CONTROL MANAGEMENT STRUCTURE

The development of a quality assurance program in any organization is a staff function, not a direct line function. Contractor staff responsible for ensuring work quality must be independent from program management. However, it is the responsibility of all staff and managers to ensure adherence with QA/QC requirements on a day-to-day basis. As shown in the general TES QA/QC management structure presented in Exhibit V-1, the TES QA/QC Manager reports directly to the corporate QA Officer, receives guidance from the EPA QA Officer, and provides guidance to the TES Program Manager. The TES QA/QC Manager also gives guidance to subcontractor

EXHIBIT V-1
TES QA/QC MANAGEMENT STRUCTURE



representatives, who are known as QA/QC Contacts or QA Coordinators. The TES QA/QC Manager is the central point of contact for all quality-related issues.

2. TES QUALITY ASSURANCE/QUALITY CONTROL FRAMEWORK

Within EPA, the Quality Assurance Management Staff (QAMS) is responsible for preparing guidelines to follow in designing the elements and framework of a QA program for an EPA office or contractor. Two major types of documents are described by QAMS to implement and monitor the QA program: a QA Program Plan (QAPP) and QA Project Plans (QAPjPs). The QAPP should provide for efficient and systematic inspection of all work to be performed, and for effective corrective actions where needed. The QAPjP together with contractor reports form the baseline upon which contractor activities and products may be compared for acceptability with respect to technical and data quality requirements. These documents are described in more detail below.

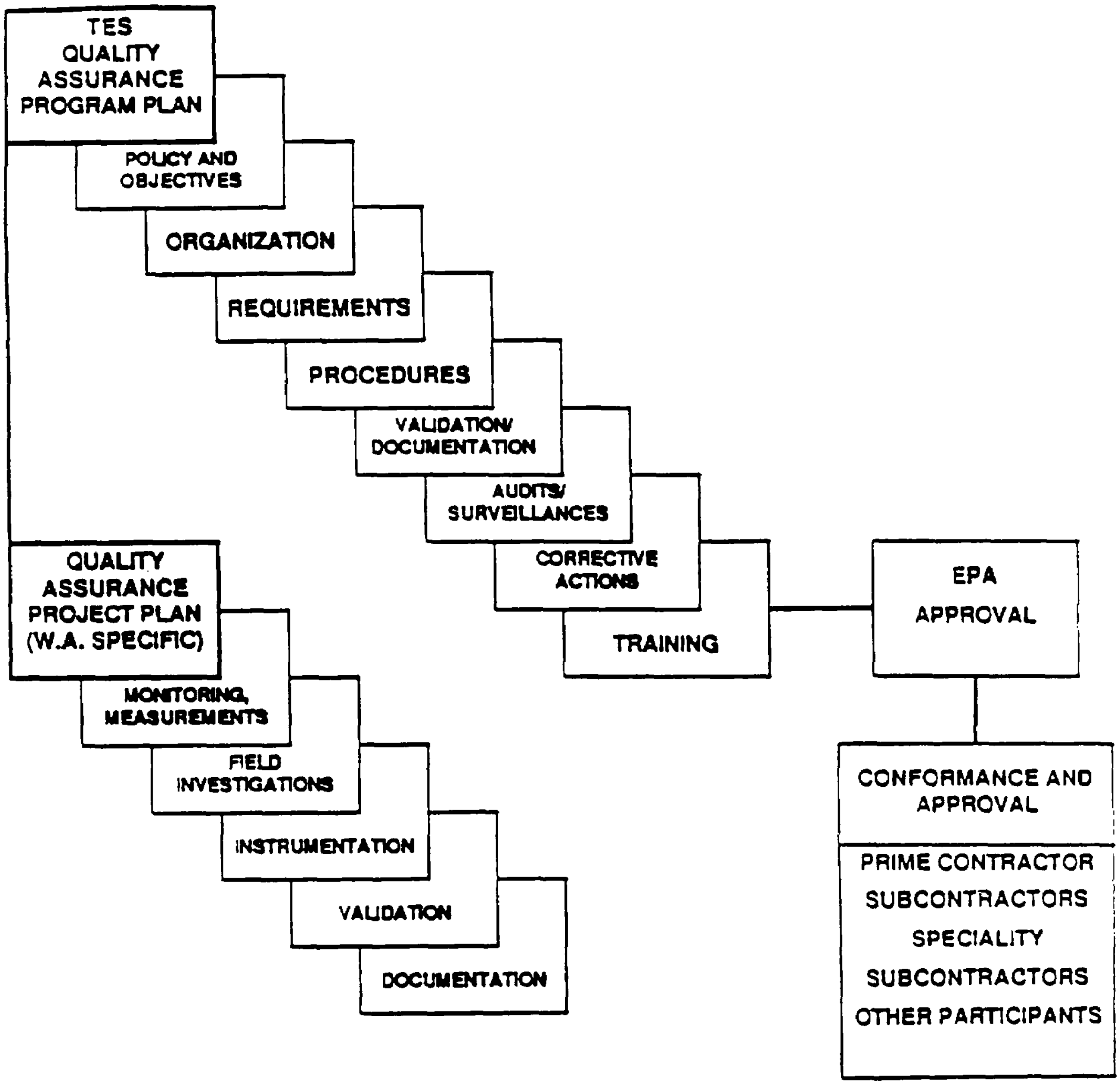
2.1 Quality Assurance Program Plan

Prior to the initiation of a contract, the TES contractor must have designed a QA program plan (QAPP) to be implemented and followed throughout the life of the contract. Input in the development of this QAPP may be provided by team subcontractors. Guidance for developing this plan can be found in "Guidelines and Specifications for Preparing Quality Assurance Program Plans (QAMS-004/80)," dated September 20, 1980. Requirements of each QAPP include a description of the following:

- QA policy statement
- QA management structure
- Personnel qualifications
- Facilities, equipment and services
- Data generation
- Data processing
- Data quality assessment
- Corrective action.

Each TES contractor must prepare this QAPP outlining the method and procedures to ensure all activities and deliverables satisfy specified technical and data quality requirements. This plan is intended to be used by all contractor and subcontractor personnel in planning and conducting their day-to-day activities, and to be used by corporate management to ensure that the QA program has been effectively implemented. Elements of the QAPP are outlined in Exhibit V-2. The QAPP is implemented after it has been approved by contractor quality assurance

EXHIBIT V-2
TES QA/QC FRAMEWORK



staff, program management and subcontractor management, as well as by the EPA QA Officer. Once approved by the EPA QA Officer, QAPP requirements are binding and all parties are expected to adhere to the policies and procedures stated in the document.

2.2 Quality Assurance Project Plans

Specific contract activities may require a detailed description of procedures used to ensure the performance of high-quality work by the contractor or associated subcontractors. The QA/QC Manager prepares a QAPjP for each activity to be conducted in the program. Regional QA Officers review and approve activity-specific QAPjPs. Work assignment work plans reference the standard procedures specified in the activity-specific QAPjPs. Although only one QAPP is required for a contract, several activity-specific QAPjPs may be required and generated during the contract period. To document these procedures, an activity-specific QAPjP is prepared. Guidance for the preparation of this document may be found in "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (QAMS-005/80)," dated December 29, 1980.

These plans present in greater detail the procedures to be followed in conducting the work assignment, including the standard operating procedures for collecting information, monitoring, measurements, conducting field investigations, calibration and maintenance of instruments, validation of findings, and documentation of all information collected. At a minimum, all of QAPjPs shall include the following:

- Project description
- Project organization and responsibilities
- QA objectives for data measurement in terms of precision, accuracy, completeness, representativeness, and comparability.

Additionally, the QAPjP should contain descriptions of procedures to conduct activities, including but not limited to the following:

- Sampling
- Sample custody
- Calibration procedures and frequency

- Analysis
- Data reduction, validation and reporting
- Internal quality control checks
- Performance and system audits
- Preventive maintenance
- Specific routine procedures used to assess data precision, accuracy and completeness
- Corrective action
- Quality assurance reports to management.

The general outline for these plans is also presented in Exhibit V-2.

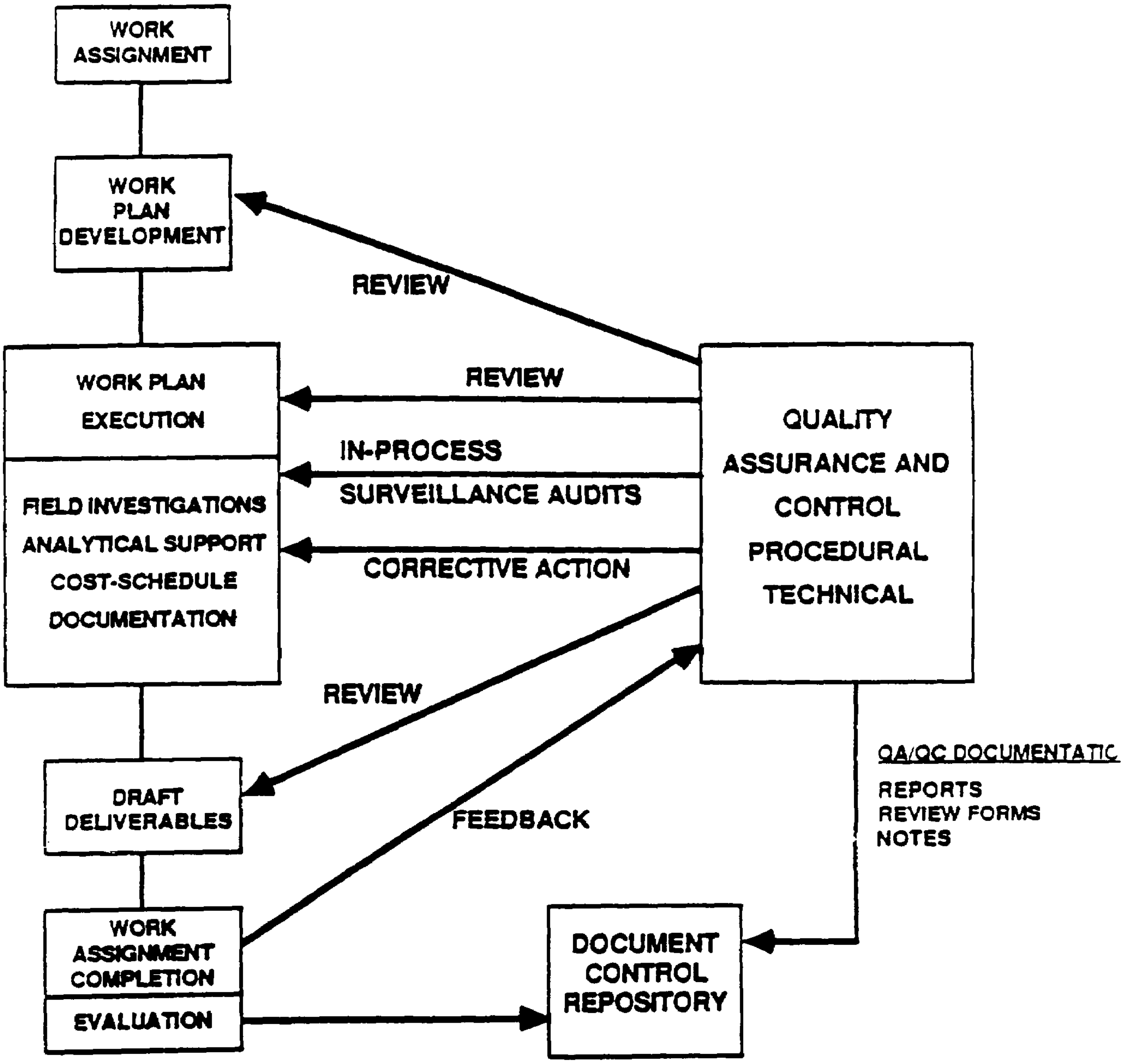
3. QUALITY ASSURANCE PROGRAM IMPLEMENTATION

There are two primary methods for implementing the QA program once it has been designed. One focuses on a day-to-day review of activities conducted under each work assignment, with ongoing interaction between the QA/QC Contacts and work assignment personnel. The other method is a periodic check of selected assignments in the TES program by the performance of audits and reviews.

3.1 Ongoing Quality Assurance Implementation

The QA/QC Managers and QA/QC Contacts associated with the TES contracts should maintain continual contact with the staff performing work assignments under the contracts beginning with work plan development and continuing through work assignment completion and final evaluation. This process is shown in Exhibit V-3. The QA/QC Contact or QA Coordinator should review work plan development and execution, audit technical work and managerial details such as meeting cost and schedule constraints, initiate corrective actions when problems or deficiencies are noted, review deliverables, and maintain a data base of information concerning the successes or problems associated with certain work assignments or task areas. Documentation of quality assurance activities in the form of reports, review forms and notes is maintained in the document control repository, as are copies of all deliverables prepared under the work assignment.

EXHIBIT V-3
TES QUALITY ASSURANCE INTERFACE ON WORK ASSIGNMENTS



3.2 Quality Assurance Reviews and Audits

Several types of reviews, audits and surveillances may be undertaken and conducted by or at the direction of the contractor QA/QC Manager to evaluate technical quality and ensure that data quality meets specified requirements. These include internal management systems audits, in-process surveillances of work assignments for technical compliance, administrative review of work assignments to ensure that contractual stipulations have been met, and review of deliverables. Written documentation of review findings should be retained in the contractor's document control repository. These four types of reviews and audits are summarized in Exhibit V-4, and described in more detail below.

Internal Management Audits

Management system audits (MSAs) are a review of the implementation of the approved Quality Assurance Program Plans. They evaluate a group's QA program associated with all contract-related activities. An MSA examines the following:

- Procedures for developing and approving QAPjPs
- The quality of existing QAPjP guidance and QAPjPs
- Procedures for developing and approving Standard Operating Procedures (SOPs)
- Procedures and schedules for conducting audits
- Tracking systems for ensuring that the QA program is operating, and that corrective actions required after audits have been taken
- The level of financial resources and personnel devoted to implementing the QA program
- The degree of management support for QA
- Responsibilities and authorities of the various line managers and the QA/QC Manager for carrying out the QA program.

The TES QA/QC Manager is responsible for the conduct of an internal MSA on contractor facilities at least once each year. Similarly, subcontractor QA/QC Contacts (QA Coordinators) are responsible for performing internal

EXHIBIT V-4
TES QA/QC REVIEWS AND AUDITS

REVIEWS, AUDITS AND SURVEILLANCES	FREQUENCY
INTERNAL MANAGEMENT AUDITS Contractor Facilities	Minimum once each year
IN-PROCESS SURVEILLANCES OF WAs Field and Laboratory Work	Selective: 10-40% of WAs
RANDOM QA REVIEW OF WAs Procedures, Cost, Schedule, Documentation	Selective: minimum 10%
DELIVERABLES Procedures, Quality	All deliverables

MSAs on their own facilities according to the same schedule. The scheduling of particular audits may be moved forward if problems are perceived, so that corrective actions may be implemented rapidly. Additional information on the conduct of MSAs can be found in "Interim Policy and Guidance For Management Systems Audits of National Program Offices," prepared by QAMS on November 30, 1985.

In-Process Surveillance of Work Assignments

In-process surveillance of work assignments is conducted on the actual technical work conducted in field and laboratory investigations. These technical systems audits (TSAs) focus on the actual quality control and environmental measurement data collection systems. A TSA entails an examination of calibration records, sampling and measurement procedures, general laboratory cleanliness, support systems, equipment and facilities, maintenance and repair records, control charts, etc. TSA auditors must be competent scientists who are familiar with the particular data collection technology and quality control procedures. TSAs are conducted on contractor and subcontractor activities in at least 10 percent of the work assignments, and if necessary, on up to 40 percent of the work assignments.

Random Quality Assurance Review of Work Assignments

The TES QA/QC Manager or the subcontractor QA/QC Contacts should conduct or direct the conduct of random QA reviews of activities of specific work assignments, focusing on adherence to procedures, cost and schedule limitations, and adequate documentation. At least 10 percent of the work assignments should be reviewed in this manner. To record the information obtained at these audits, standardized forms may be prepared by the prime contractor or subcontractors for use.

Review of Deliverables

The TES QA/QC Manager or the subcontractor QA/QC Contact or QA Coordinator must ensure that all deliverables generated have been reviewed to ensure that appropriate procedures have been followed, and that the deliverables are of high quality. Typically, the Work Assignment Manager or the TES Program Manager actually conducts the review, identifies problems and corrective actions, and ensures follow-through by the authors of the deliverable. To record the information obtained at these audits, standardized forms may be prepared by the prime contractor or subcontractors for use.

8. U.S. GEOLOGICAL SURVEY (U.S.G.S.)

The United Stated Geological Survey develops a wide range of mapping and data compilation services. One of the functions of the Survey's Topographic Division is to provide nationwide, systematic and comprehensive landuse and land cover maps for use by natural resource managers and others. Specific maps that may be of use to RCRA inspectors are:

- Topographic Quadrangle Maps - which show the contours of the land, the network of water features, and elevations. They also show cities and urban areas and can be used to determine the proximity of a spill or waste site to a lake, river, stream, or population center.

- Hydrologic Maps - which show water in or beneath the land surface. They are very useful when evaluating water supply. They show drainage areas, depth to ground water, and the thickness of water bearing formations. Hydrologic maps can be used to make general checks of information supplied by the O/O regarding the site hydrology. In the event of releases, hydrologic maps can be used by hydrogeologists to identify possible areas of ground water contamination.

- Land use and Land Cover Maps - are prepared using topographic quadrangle maps and aerial photographs. These maps provide detailed information about the land use, and about the vegetation cover. In some instances these maps may be used in conjunction with aerial photographs to determine the extent of waste contamination and migration by identifying the boundaries of stressed vegetation.

Many Regions have memoranda of understanding (MOU) with the U.S.G.S. Specific arrangements and services that U.S.G.S has with the Regions can be found in these MOUs.

Sources of Maps

All maps are available from:

Branch of Distribution
U.S. Geological Survey
Box 25286, Federal Center
Denver, CO 80225
Telephone: (303) 236-7477

Cost of Maps (1988)

Standard Topographic Maps	$2.50
Hydrologic Atlas Maps	$2.40 to $13.60
Land No/Land Cover Maps	$4.00

9. THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

The Occupational Safety and Health Administration (OSHA) was created within the Department of Labor to:

- Encourage employers and employees to reduce workplace hazards and to implement new or improve existing safety and health programs

- Provide for research in occupational safety and health to develop innovative ways of dealing with occupational safety and health problems

- Establish "separate but dependent responsibilities and rights" for employers and employees for the achievement of better safety and health conditions

- Maintain a reporting and recordkeeping system to monitor job-related injuries and illnesses

- Establish training programs to increase the number and competence of occupational safety and health personnel

- Develop mandatory job safety and health standards and enforce them effectively

- Provide for the development, analysis, evaluation and approval of State occupational safety and health programs.

While OSHA continually reviews and redefines specific standards and practices, its basic purposes remain constant. OSHA strives to implement its Congressional mandate fully and firmly with fairness to all concerned. In all its procedures, from standards development through implementation and enforcement, OSHA guarantees employers and employees the right to be fully informed, to participate actively and to appeal actions.

EPA inspectors are encouraged to report unsafe work environments to the local OSHA office. Examples of the types of unsafe work environments that might warrant contacting OSHA include:

- Inspection of wastewater treatment units at an electroplating facility generating (F006) sludges might reveal cyanide destruction processes which rely on chlorine as the oxidant. Poor process control of chemical dosing can lead to the build-up of noxious fumes.
- During construction of new solid waste management units trenches are frequently excavated to bury pipes carrying wastes. If workers are in trenches that have not been shored up, a hazard exists.
- During corrective action, a facility may employ additional laborers to expedite the clean-up process. If laborers are unfamiliar with the hazards associated with this work, they may not be knowledgeable enough to request safety equipment. If none is provided by the owner/operator in a clearly hazardous environment, the inspector should contact the OSHA office.

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Comm. Phone: 312-896-8700
FTS Phone: None

CINCINNATI AREA OFFICE

William Murphy, Area Director
US Department of Labor - OSHA
Federal Office Building Rm. 4028
550 Main Street
Cincinnati, Ohio 45202
Comm. Phone: 513-684-3784
FTS Phone: 684-3784

CLEVELAND AREA OFFICE

William A. Thomas, Area Director
US Department of Labor - OSHA
Federal Office Building Rm. 899
1240 East 9th Street
Cleveland, Ohio 44199
Comm. Phone: 216-522-3818
FTS Phone: 942-3818

COLUMBUS AREA OFFICE

James Vaughan, Area Director
US Department of Labor - OSHA
Federal Office Building Rm. 634
200 North High Street
Columbus, Ohio 43215
Comm. Phone: 614-469-5582
FTS Phone: 943-5582

INDIANAPOLIS AREA OFFICE

Gary Anderson, Area Director
US Department of Labor - OSHA
USPO & Courthouse Rm. 422
46 East Ohio Street
Indianapolis, Indiana 46204
Comm. Phone: 317-269-7290
FTS Phone: 331-7290

APPLETON AREA OFFICE

Melvin Lischefski, Area Director
US Department of Labor - OSHA
2618 North Ballard Road
Appleton, Wisconsin 54915
Comm. Phone: 414-734-4521
FTS Phone: None

MILWAUKEE AREA OFFICE

Gerald Cunningham, Area Director
US Department of Labor - OSHA
Henry S. Reuss Building
310 West Wisconsin Avenue, Suite 1180
Milwaukee, Wiscinisn 53203
Comm. Phone: 414-291-3315
FTS Phone: 362-3315

MADISON AREA OFFICE

Jack Janda, Area Director
US Department of Labor - OSHA
2934 Fish Hatchery Road Suite 220
Madison, Wisconsin 52713
Comm. Phone: 608-264-5388
FTS Phone: 364-5388

EAU CLAIRE DISRICT OFFICE

Timothy Kobernat, District Supervisor
US Department of Labor - OSHA
Federal Building US Courthouse
500 Barstow Street Rm. B-9
Eau Claire, Wisconsin 54701
Comm. Phone: 715-832-9019
FTS Phone: None

TOLEDO AREA OFFICE

Arnie Andersons, Area Director
US Department of Labor - OSHA
Federal Office Building Rm. 734
234 North Summit Street
Toledo, Ohio 43604
Comm. Phone: 419-259-7542
FTS Phone: 979-7542

MINNEAPOLIS AREA OFFICE

Charles Burin, Area Director
US Department of Labor - OSHA
110 South 4th Street Rm. 425
Minneapolis, Minnesota 55401
Comm. Phone: 612-348-1994
FTS Phone: 777-1994

PEORIA AREA OFFICE

Gerald Gravatt, Area Director
US Department of Labor - OSHA
2001 West Willow Knolls Road
Peoria, Illinois 61615
Comm. Phone: 309-671-7033
FTS Phone: 360-7033

BELLEVILLE DISTRICT OFFICE

Richard W. Taylor, District Supervisor
US Department of Labor - OSHA
218A Main Street
Belleville, Illinois 62220
Comm. Phone: 618-277-5300
FTS Phone: None

LANSING AREA OFFICE

William Funcheon, Area Director
US Department of Labor - OSHA
300 East Michigan Rm. 202
Lansing, Michigan 48933
Comm. Phone: 517-377-1892
FTS Phone: 374-1892

DALLAS - REGION VI (ARKANSAS, LOUISIANA, NEW MEXICO, OKLAHOMA AND TEXAS)

DALLAS REGIONAL OFFICE

Gilbert J. Saulter, Regional Administrator
US Department of Labor - OSHA
525 Griffin Street Rm. 602
Dallas, Texas 75202
Comm. Phone: 214-767-4731
FTS Phone: 729-4731

DALLAS AREA OFFICE

James T. Knorpp, Area Director
US Department of Labor - OSHA
1425 West Pioneer Drive
Irving, Texas 75061
Comm. Phone: 214-767-5347
FTS Phone: 729-5347

AUSTIN AREA OFFICE

Nickie Nicholas, Area Director
US Department of Labor - OSHA
611 East 6th Street Rm.303
Austin, Texas 78701
Comm. Phone: 512-482-5783
FTS Phone: 770-5783

ALBUQUERQUE AREA OFFICE

James W. Males, Area Director
US Department of Labor - OSHA
320 Canteral Avenue, S.W. Suite 13
Albuquerque, New Mexico 87102
Comm: Phone: 505-776-3411
FTS Phone: 474-3411

BATON ROUGE AREA OFFICE

Paul J. Hansen, Area Director
US Department of Labor - OSHA
Hoover Annex Suite 200
2156 Wooddale Boulevard
Baton Rouge, Louisiana 70806
Comm. Phone: 504-389-0474
FTS Phone: 687-0474

CORPUS CHRISTI AREA OFFICE

Robert L. M. Hunter Jr., Area Director
US Department of Labor - OSHA
Government Plaza Rm. 300
400 Mann Street
Corpus Christi, Texas 78401
Comm. Phone: 512-888-3257
FTS Phone: 529-3257

LUBBOCK AREA OFFICE

Vacant
US Department of Labor - OSHA
Federal Building Rm. 421
1205 Texas Avenue
Lubbock, Texas 79401
Comm. Phone: 806-743-7681
FTS Phone: 738-7681

HOUSTON AREA OFFICE

Gerald Baty, Area Director
US Department of Labor - OSHA
2320 LaBranch Street Rm.1103
Houston, Texas 77004
Comm Phone: 713-750-1727
FTS Phone: 526-6727

OKLAHOMA CITY AREA OFFICE

William W. White, Jr., Area Director
US Department of Labor - OSHA
Main Place
420 West Main Place, Suite 725
Oklahoma City, Oklahoma 73118
Comm Phone: 405-231-5351
FTS Phone: 736-5351

LITTLE ROCK AREA OFFICE

Glen R. Williamson, Area Director
US Department of Labor - OSHA
Savers Building, Suite 828
320 West Capitol Avenue
Little Rock, Arkansas 72201
Comm. Phone: 501-378-6291
FTS Phone: 740-6291

KANSAS CITY - REGION VII (IOWA, KANSAS, MISSOURI AND NEBRASKA)

KANSAS CITY REGIONAL OFFICE

Roger Clark, Regional Administrator
US Department of Labor - OSHA
911 Walnut Street Rm. 406
Kansas City, Missouri 64106
Comm. Phone: 816-374-5861
FTS Phone: 758-5861

KANSAS CITY AREA OFFICE

John O. Schiltz, Area Director
US Department of Labor - OSHA
911 Walnut Street Rm. 2202
Kansas City, Missouri 64106
Comm. Phone: 816-374-2756
FTS Phone: 758-2756

ST. LOUIS AREA OFFICE

Denver Holt, Area Director
US Department of Labor - OSHA
4300 Goodfellow Boulevard - Building 105E
St. Louis, Missouri 63120
Comm. Phone: 314-263-2749
FTS Phone: 273-2749

DES MOINES AREA OFFICE

Alonzo L. Griffin, Area Director
US Department of Labor - OSHA
210 Walnut Street Rm. 815
Des Moines, Iowa 50309
Comm. Phone: 515-284-4794
FTS Phone: 862-4794

WICHITA AREA OFFICE

Jeff Spahn, Area Director
US Department of Labor - OSHA
216 North Waco Suite B
Wichita, Kansas 67202
Comm. Phone: 316-269-6644
FTS Phone: 752-6644

OMAHA AREA OFFICE

Carmine A. Barone, Area Director
US Department of Labor - OSHA
Overland - Wolf Building Rm. 100
6910 Pacific Street
Omaha, Nebraska 68106
Comm. Phone: 402-221-3182
FTS Phone: 864-3182

DENVER - REGION VIII (COLORADO, MONTANA, NORTH DAKOTA, SOUTH DAKOTA, UTAH AND WYOMING)

DENVER REGIONAL OFFICE

Byron R. Chadwick, Regional Administrator
US Department of Labor - OSHA
Federal Building Rm. 1576
1961 Stout Street
Denver, Colorado 80294
Comm. Phone: 303-844-3061
FTS Phone: 564-3061

BILLINGS AREA OFFICE

David J. DiTommaso, Area Director
US Department of Labor - OSHA
19 North 25th Street
2812 1st Avenue North
Billings, Montana 59101
Comm. Phone: 406-657-6649
FTS Phone: 585-6649
1-800-332-7087

DENVER AREA OFFICE

Gerard Ryan, Area Director
US Department of Labor - OSHA
Tremont Center - 1st Floor
333 West Colfax
Denver, Colorado 80204
Comm. Phone: 303-844-5285
FTS Phone: 564-5285
1-800-332-5858

BISMARCK AREA OFFICE

Bruce C. Beelman, Area Director
US Department of Labor - OSHA
Federal Building Rm. 348
PO Box 2439
Bismarck, North Dakota 58501
Comm. Phone: 701-255-4011 EXT. 521
FTS Phone: 783-4521

SALT LAKE CITY AREA OFFICE

Robert Curtis, Area Director
US Department of Labor - OSHA
1781 South 300 West
Salt Lake City, Utah 84115
Comm. Phone: 801-524-5080
FTS Phone: 588-5080

SAN FRANCISCO - REGION IX (AMERICAN SAMOA, ARIZONA, CALIFORNIA, GUAM, HAWAII, NEVADA, TRUST TERRITORY OF THE PACIFIC ISLANDS)

SAN FRANCISCO REGIONAL OFFICE

Vacant
(James Lake, Acting Regional Administrator)
US Department of Labor - OSHA
450 Golden Gate Avenue
PO Box 36017
San Francisco, California 94102
Comm. Phone: 415-556-7260
FTS Phone: 556-7260
Toll Free 800-648-1003

LONG BEACH AREA OFFICE

Les Michael, Area Director
US Department of Labor - OSHA
400 Oceangate Suite 530
Long Beach, California 90802
Comm. Phone: 213-514-6387
FTS Phone: 795-6387

SACRAMENTO AREA OFFICE

Ryan Kuehmichel, Area Director
US Department of Labor - OSHA
2422 Arden Way, Suite A-1
Sacramento, California 95825
Comm. Phone: 916-646-9220
FTS Phone: None

SAN DIEGO AREA OFFICE

Gerard Ryan, Area Director
US Department of Labor - OSHA
7807 Convoy Court, Suite 160
San Diego, California 92111
Comm. Phone: 619-569-9071
FTS Phone: None

WALNUT CREEK AREA OFFICE

Alan Traenkner, Area Director
US Department of Labor - OSHA
801 Ygnacio Valley Road, Suite 205
Walnut Creek, California 94596-3823
Comm. Phone: 415-943-1973
FTS Phone: None

WEST COVINA AREA OFFICE

Gerald Baty, Area Director
100 N. Citrus Avenue, Suite 240
(Coast Savings building)
West Covina, California 91791
Comm. Phone: 818-915-1558

HONOLULU AREA OFFICE

Tom Marple, Area Director
US Department of Labor - OSHA
300 Ala Moana Boulevard Suite 5122
PO Box 50072
Honolulu, Hawaii 96850
Comm. Phone: 808-541-2685
FTS Phone: 551-2685

PHOENIX AREA OFFICE

Elliot Gilmore, Area Director
US Department of Labor - OSHA
3221 North 16th Street, Suite 100
Phoenix, Arizona 85016
Comm. Phone: 602-241-2006
FTS Phone: 261-2006

LAS VEGAS DISTRICT OFFICE

Vacant
US Department of Labor - OSHA
550 East Charleston Blvd.
Las Vegas, Nevada 89104
Comm. Phone: 702-388-6163
FTS Phone: 598-6163

SEATTLE - REGION X (ALASKA, IDAHO, OREGON AND WASHINGTON)

SEATTLE REGIONAL OFFICE

James W. Lake, Regional Administrator
US Department of Labor - OSHA
Federal Office Building Rm. 6003
909 1st Avenue
Seattle Washington 98174
Comm. Phone: 206-442-5930
FTS Phone: 399-5930

ANCHORAGE AREA OFFICE

Leonard Limtiaco, Area Director
US Department of Labor - OSHA
Federal Building
701 C Street Box 29
Anchorage, Alaska 99513
Comm. Phone: 907-271-5152
FTS Phone: None

BELLEVUE AREA OFFICE

Ronald T. Tsunehara, Area Director
US Department of Labor - OSHA
121 - 107th Avenue, N.E.
Bellevue, Washington 98004
Comm. Phone: 206-442-7520
FTS Phone: 399-7520

BOISE AREA OFFICE

David Bernard, Area Director
US Department of Labor - OSHA
Room 324, Federal Building/USCH
550 West Fort Street, Box 007
Boise, Idaho 83724
Comm. Phone: 208-334-1867
FTS Phone: 554-1867

PORTLAND AREA OFFICE

William W. Newman, Area Director
US Department of Labor - OSHA
1220 Southwest 3rd Street Rm. 640
Portland, Oregon 97204
Comm. Phone: 503-221-2251
FTS Phone: 423-2251

10. U.S. ARMY CORPS OF ENGINEERS (USACE)

The Corps of Engineers is responsible for design and construction of all new hazardous waste facilities owned by the Army. It is also responsible for site inspection, assessment, feasibility studies, and remedial action at Army controlled hazardous waste sites that are active or abandoned. Some limited work of this type is also being done for the Air Force.

In addition the Corps is responsible for investigating all former Department of Defense (DOD) control facilities. They are to investigate the site for hazardous waste contamination and if the DOD is a responsible party they are to oversee/perform the remedial action. The Corps also has conducted oversite for state lead projects.

The EPA has developed a memorandum of understanding (MOU) with the Corps of Engineers for its assistance in assessing and addressing Superfund site remedial actions. A copy of the draft "Procedures for Using Enforcement Inter-Agency Agreements Between the USACE and the EPA" is attached.

This document presents procedures for obtaining assistance from the Corps of Engineers and provides a list of Regional contacts. Although the Army Corps of Engineers does not have a MOU with the RCRA program, the Corps will provide similar assistance to the RCRA Enforcement staff within Corps of Engineers' manpower constraints, and EPA funding capabilities.

DRAFT

PROCEDURES FOR USING ENFORCEMENT INTERAGENCY AGREEMENTS BETWEEN THE U.S. ARMY CORPS OF ENGINEERS AND THE ENVIRONMENTAL PROTECTION AGENCY

I. PURPOSE

The purpose of this section is to define the use of interagency agreements (IAGs) between the U.S. Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA) for Enforcement Technical Assistance and to delineate the correct procedures for implementation.

II. DEFINITION AND INTENT

The USACE has agreed to provide EPA with technical assistance during CERCLA enforcement actions at hazardous waste sites. This support will be provided through a site-specific IAG for one type of work (e.g., Oversight of PRP RI/FS, Attachment A, Model IAG, E. Scope of Work Categories) at a CERCLA site.

The USACE has made a commitment to support the "National Program Level" and to accept all CERCLA enforcement projects identified in SCAP/CERCLIS. The only exceptions are projects requiring, Oversight of a PRP (Potentially Responsible Party) Remedial Action (RA). These projects will be supported by the USACE on a case by case basis, subject to available resources at a construction district.

III. EXECUTING THE INTERAGENCY AGREEMENT

The following procedures are provided to assist the EPA Remedial Project Manager (RPM) in planning and executing IAGs with the USACE:

(1) CERCLA Enforcement Projects Except Oversight of PRP RA

a) The EPA RPM will plan for USACE support through the CERCLIS Site-Specific data base, under the appropriate event or enforcement activity. Upon receipt of the signed IAG from the USACE, the EPA RPO will enter Actual Obligations and their corresponding Account Number and Document Control Number in the CERCLIS Site-Specific data base. FMS data transfer will update the Actual Obligations entered by the EPA RPO and post Actual Cumulative Disbursements.

b) The EPA RPM will prepare a detailed Statement of Work, schedule and cost estimate. This information will be transmitted to the appropriate USACE Superfund Coordinator (Attachment A) at the Omaha or Kansas City District. The cover letter to the USACE will request that a work plan and budget estimate be prepared and returned within 30 days to the EPA RPM.

c) The EPA RPM/Regional Project Officer (RPO) will prepare and process through appropriate channels a site-specific IAG for the amount designated in the USACE budget estimate. The EPA Statement of Work and the USACE work plan will be included as attachments to the IAG. A minimum of two copies with original signatures will be sent to the USACE, Engineering Division, Missouri River (MRD), Post Office Box 103, Omaha, Nebraska 68101-0103 for acceptance. One original will be retained by the USACE and the remaining original(s) will be returned to the issuing EPA office.

(2) <u>Oversight of PRP RA</u>

a) The EPA RPM will implement the procedures as described above for planning and tracking USACE support in SCAP/CERCLIS.

b) The EPA RPM will contact the appropriate USACE Superfund Coordinator (Attachment A) to ascertain whether there are available resources, at a particular USACE construction district, to perform the assignment. The EPA RPM will provide the site name, location, cost estimate and expected duration of the assignment to the USACE Superfund Coordinator. Within 7 days the USACE Superfund Coordinator will contact the EPA RPM with its determination as to available resources.

c) The EPA RPM will prepare a detailed Statement of Work, schedule and cost estimate. This information will be transmitted to the appropriate USACE Superfund Coordinator (Attachment A). The cover letter to the USACE will request that a work plan and budget estimate be prepared and returned within 30 days to the EPA RPM.

d) The EPA RPM/Regional Project Officer (RPO) will prepare and process through appropriate channels a site-specific IAG for the amount designated in the USACE budget estimate. The EPA Statement of Work and the USACE work plan will be included as attachments to the IAG. A minimum of two copies with original signatures will be sent to the USACE, Engineering Division, Missouri River (MRD), Post Office Box 103, Omaha, Nebraska 68101-0103 for acceptance. One original will be retained by the USACE and the remaining original(s) will be returned to the issuing EPA office.

(3) Federal Enforcement Remedial Design (FERD)

The USACE will conduct remedial designs at selected enforcement sites. The EPA RPM will prepare IAGs according to the process outlined in "Procedures For Using Generic Interagency Agreements Between the U.S. Army Corps of Engineers and the Environmental Protection Agency" for Technical Assistance and First Phase Design. The site-specific IAG for the design will be prepared using the "Superfund Remedial Design" model IAG.

The EPA RPM will plan for USACE support through SCAP/CERCLIS utilizing established procedures for Technical Assistance, First Phase Design and Superfund Remedial Design. Technical Assistance should be initiated at the end of the RD/RA negotiations. First Phase Design should be initiated at the time the case is referred to Headquarters. The Remedial Design should begin as soon as possible after completion of the First Phase Design.

IV. AMENDING THE INTERAGENCY AGREEMENT

(1) Extension of Project Period "Period of Performance"

The USACE may request an extension in the period of performance due to changes in scheduling or requirements of the assignment. The EPA RPM/RPO will amend the site-specific IAG to allow work to continue.

(2) Increase in Funds

The USACE may request an increase in funds to complete an assignment. If the additional funds requested are substantial, a revised work plan and budget will be prepared by the USACE. The EPA RPM/RPO may amend the Statement of Work, if there are substantial changes in the work to be performed. The EPA RPM/RPO will amend the site-specific IAG.

(3) Decrease in Funds

The USACE will request a decrease in funds upon completion of the assignment. The EPA RPM/RPO will decrease funds by preparing and processing, through appropriate channels, a request to closeout the site-specific IAG and deobligate the remaining funds.

U.S. ARMY CORPS OF ENGINEERS SUPERFUND COORDINATORS AND REGIONAL RESPONSIBILITIES

Division	Construction District	EPA Region	State/ Territory	Division POC/ALT	Organization	Telephone	Mail Address
NED	NED	I	ME	Gregory Buteau	CENED-ED-E	(617) 647-8523	424 Trapelo Road
(New England)	NED	I	VT				Waltham, MA
	NED	I	MA	(Alt) Richard Carlson	CENED-CD	(617) 647-8260	02254-9149
	NED	I	NH				
	NED	I	RI				
	NED	I	CT				
NAD	New York	II	NY	Remo J. Lusardi	CENAD-CO	(212) 264-4912	90 Church Street
(North	New York	II	NJ				New York, NY
Atlantic)	Baltimore	III	PA	(Alt) Frank Tangorra	CENAD-CO	(212) 264-4025	10007-9998
	Baltimore	III	DE				
	Baltimore	III	MD				
	Norfolk	III	VA				
	Baltimore	III	DC				
SAD	Jacksonville	II	VI	Richard Connell	CESAD-EN-G	(404) 331-4361	510 Title Bldg.
(South	Jacksonville	II	PR				30 Pryor St, SW
Atlantic)	Wilmington	IV	NC	(Alt) Claude F. Rhoads	CESAD-CO-CM	(404) 331-5283	Atlanta, GA
	Charleston	IV	SC				30335-6801
	Mobile	IV	AL				
	Savannah	IV	GA				
	Jacksonville	IV	FL				
ORD	Huntington	III	WV	Garry Gerlach	CEORD-ED-M	(513) 684-3805	P. O. Box 1159
(Ohio River)	Louisville	IV	KY				Cincinnati, OH
	Nashville	IV	TN	(Alt) Gary Mosteller	CEORD-ED-M	(513) 684-3756	45201-1159
	Louisville	V	IN				
	Huntington	V	OH				

U.S. ARMY CORPS OF ENGINEERS SUPERFUND COORDINATORS AND REGIONAL RESPONSIBILITIES

Division	Construction District	EPA Region	State/ Territory	Division POC/ALT	Organization	Telephone	Mail Address
NCD	St. Paul	V	MN	Sam Nakib	CENCD-CO-C	(312) 353-7850	536 S. Clark St.
(North Central)	St. Paul	V	WI				Chicago, IL
	Detroit	V	MI	(Alt) Elliot Jassak	CENCD-CO-C	(312) 886-9307	60605-1592
	Chicago	V	IL				
LMVD	Vicksburg	IV	MS	James O. Farrell	CELMV-ED-WH	(601) 634-5890	P. O. Box 80
(Lower Mississippi Valley)	New Orleans	VI	LA	(Alt) Larry Eckenrod		(601) 634-5917	Vicksburg, MS 39180-0080
SWD	Albuquerque	VI	NM	William S. Craig	CESWD-ED-E	(214) 767-8648	1114 Commerce St.
(Southwestern)	Fort Worth	VI	TX				Dallas, TX
	Little Rock	VI	AR	(Alt) Jesse L. Range	CESWD-ED-E	(214) 767-8604	75242-0216
	Tulsa	VI	OK				
MRD	Omaha	VII	NE	Randal K. Peterson	CEMRD-ED-TE	(402) 221-7324	P. O. Box 103
(Missouri	Omaha	VII	IA				Downtown Station
River)	Kansas City	VII	MO	(Alt)Richard P. Winnike	CEMRD-ED-TE	(402) 221-7317	Omaha, NE
	Kansas City	VII	KS				68101-0103
	Omaha	VIII	MT				
	Omaha	VIII	ND				
	Omaha	VIII	SD				
	Omaha	VIII	WY				
	Omaha	VIII	CO				

ATTACHMENT A

U.S. ARMY CORPS OF ENGINEERS SUPERFUND COORDINATORS AND
REGIONAL RESPONSIBILITIES

Division	Construction District	EPA Region	State/ Territory	Division POC/ALT	Organization	Telephone	Mail Address
NPD	Seattle	X	WA	Larry Anderson	CENPD-EN-TE	(503) 221-3854	P. O. Box 2870
(North	Portland	X	OR				Portland, OR
Pacific)	Walla Walla	X	ID	(Alt) George Dunham	CENPD-EN-TE	(503) 294-5316	97208-2870
	Alaska	X	AK				
SPD	Sacramento	IX	CA	Anthony L. Mei	CESPD-CO-CE	(415) 556-3483	630 Sansome St.
(South	Sacramento	VIII	UT				San Francisco, C
Pacific)	Los Angeles	IX	AZ	(Alt) Thomas	CESPD-ED-PM	(415) 556-5982	94111-2206
	Los Angeles	IX	NV	Chamberland			
POD	POD	IX	HI	Walter Hee	CEPOD-CO-QE	(808) 438-9982	Bldg. 230
(Pacific	POD	IX	GU				Ft. Shafter, HI
Ocean)	POD	IX	AS	(Alt) Louis Muzzarini	CEPOD-CO-Q	(808) 438-1548	96858-5440
	POD	IX	CM				
	POD	IX	TT				

ATTACHMENT A

U.S. ARMY CORPS OF ENGINEERS SUPERFUND COORDINATORS AND
REGIONAL RESPONSIBILITIES

Office/ Division	Design District	EPA Region	POC/ALT	Organization	Telephone	Mail Address
MRD Design Coordinators:						
	Omaha	I, III, V, VIII, IX	Stan Carlock (Alt) Robert Smart	CEMRO-ED-E CEMRO-ED-E	(402) 221-4373 (402) 221-4170	215 N. 17th St. Omaha, NE 68102-4978
	Kansas City	II, IV, VI, VII, X	Frank Bader (Alt) Henry Munoz	CEMRK-ED-T CEMRK-ED-TS	(816) 374-5668 (816) 374-5332	700 Federal Bldg. Kansas City, MO 64106-2896
		All regions on financial management matters.	William Mulligan	CEMRD-RM-B	(402) 221-7227	P. O. Box 103 Downtown Station Omaha, NE 68101-0103
HQUSACE (Headquarters)			James Ballif, Supervisor	CEEC-EB	(202) 272-8880	20 Mass. Ave, NW Washington, DC 20314-1000
		I, II	Dr. Reuben Sawdaye	CEEC-EB	(202) 272-8881	
		III, IV	Dr. Bruce Heitke	CEEC-EB	(202) 272-8882	
		IV (KY, TN), V, VI	Bob Ross	CEEC-EB	(202) 272-0415	
		VII, VIII	C. J. Huang	CEEC-EB	(202) 272-8883	
		IX, X	Paul Lancer	CEEC-EB	(202) 272-8884	
		All regions on financial management matters.	Vera Dwaileebe	CEEC-EB	(202) 272-8886	

ATTACHMENT

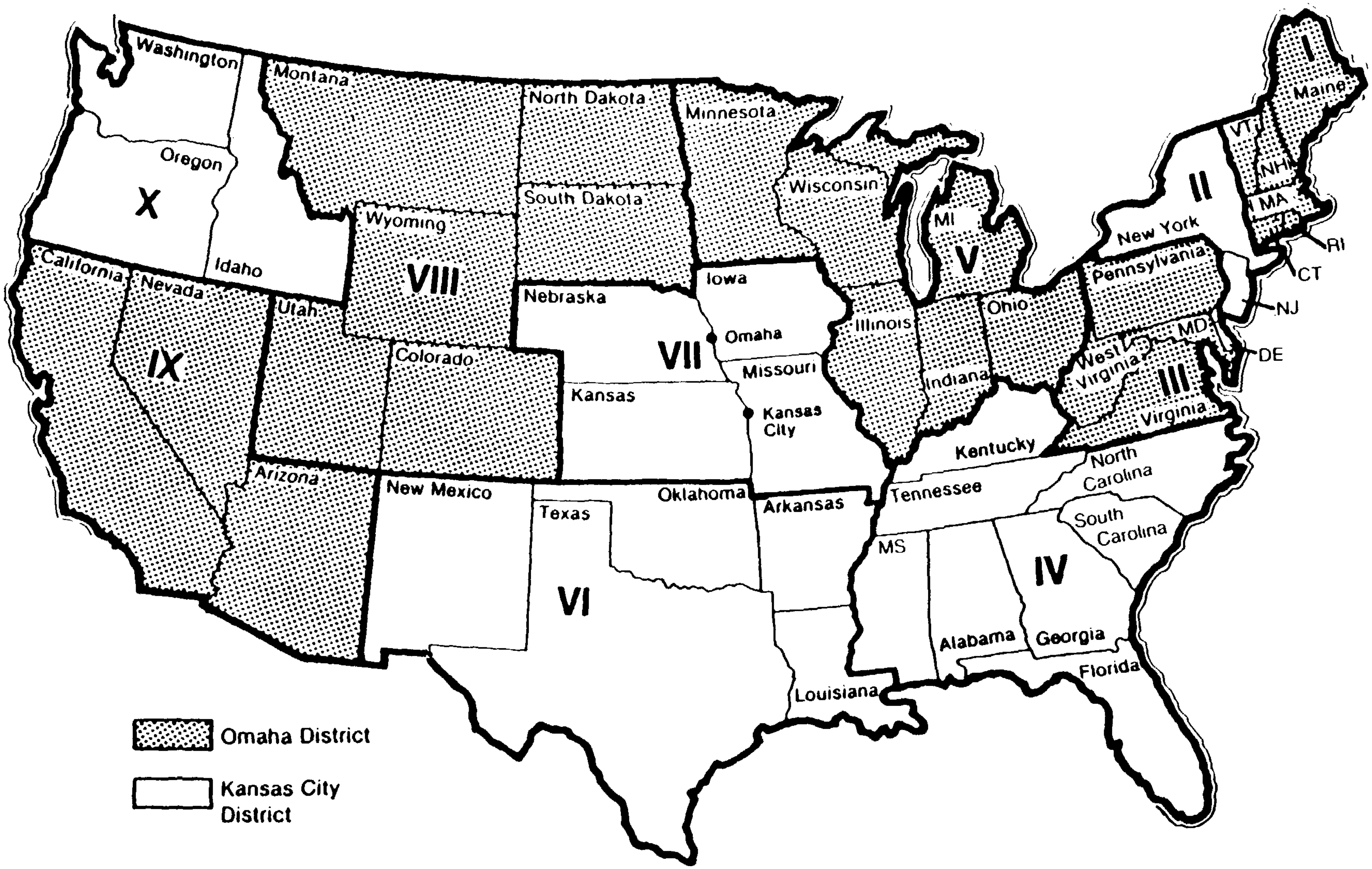

Figure 2 — Corps Regional Assignments for Superfund Projects in Continental US

Decision Memorandum

Regional Superfund Interagency Agreement
for Enforcement Technical Assistance

SUBJECT: Superfund Interagency Agreement with the U.S. Army Corps of Engineers (USACE)

TO: Regional Administrator, Region ______

FROM: ____

I recommend that you, as the EPA Action Official, approve and sign the attached Interagency Agreement (IAG). Under the IAG the USACE will provide EPA with technical assistance during CERCLA enforcement actions at the ___________________________________ hazardous waste site.

The IAG's project (site) activities and provisions are in compliance with the following statutory and EPA policy requirements:

1) Statutory
- Economy Act of 1932, as amended (31 USC 1535)
- CERCLA (42 USC 9601FF)
- SARA (42 USC 9601-9675)

2) Policy
- E.O. 12580
- EPA IAG Policy and Procedure Compendium
- Chapter 51, EPA Assistance Administration Manual
- SCAP
- MOU

NOTE: If an increase-in-funds amendment add:

The increase in funds will cover costs for activities related to the original Scope of Work. These activities are necessary to maintain the progress towards the successful completion of SCAP.

Please read instructions on pages 4 and 5

US ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

INTERAGENCY AGREEMENT/AMENDMENT
Part I — GENERAL INFORMATION

1 IAG Identification Number: DW96 ________

2 Funding Location by Region: As appropriate

3 Type of Action: New Agreement

4 Program Abbreviation: As appropriate

5 Name and Address of EPA Organization
Regional Address

6. Name and Address of Other Agency
U.S. Army Corps of Engineers (USACE)
Engineering Division, Missouri River
Omaha, Nebraska 68101-0103

7 Project Title
CERCLA Enforcement Support at ________________________________

8 EPA Project Officer *(Name, Address, Telephone Number)*
Regional Project Officer
Environmental Protection Agency
Regional Address

9 Other Agency Project Officer *(Name, Address, Telephone Number)*
William Mulligan FTS/864-7227
USACE, Engineering Division, Missouri River
P. O. Box 103, Downtown Station
Omaha, Nebraska 68101-0103

10 Project Period
*

11 Budget Period
* (same as project period)

12 Scope of Work *(Attach additional sheets, as needed)*

The U.S. Army Corps of Engineers (USACE) will provide EPA with technical assistance during CERCLA enforcement actions at hazardous waste sites.

EPA's CERCLA enforcement program is centered on four key activities;(1) Identification of Potentially Responsible Parties (PRPs) (2) Negotiations with PRPs to conduct the Remedial Investigation/Feasibility Study (RI/FS) , Remedial Design (RD), and Remedial Action (RA) (3) Oversight of actions (RI/FS,RD,RA) conducted by PRPs (4) Litigation against PRPs to compel them to perform the RI/FS,RD/RA and/or recover the government's costs for Superfund financed actions. It is in this context that all assistance under this agreement will be performed.
(continued on Attachment A)

13 Statutory Authority for both Transfer of Funds and Project Activities CERCLA [PL 96-510] SARA [PL 99-499],E.O. 12580, The Economy Act As Amended [31 USC 1535]

14 Other Agency Type: Federal

FUNDS	PREVIOUS AMOUNT	AMOUNT THIS ACTION	AMENDED TOTAL
15 EPA Amount		*	
16 EPA In-Kind Amount			
17 Other Agency Amount			
18 Other Agency In-Kind Amount			
19 Total Project Cost		*	

20 Fiscal Information

Program Element	FY	Appropriation	Doc Control No	Account Number	Object Class	Obligation Deobligation Amt
*GBY3A	*	68/20X8145	*	* Activity Code : B,P, or 2	25.76	*

EPA Form 1610-1 (Rev. 8-84) Previous editions are obsolete

PART II — APPROVED BUDGET	IAG IDENTIFICATION NO
21 Budget Categories	Total Itemization of Estimated Cost to Date
(a) Personnel	$
(b) Fringe Benefits	
(c) Travel	
(d) Equipment	
(e) Supplies	
(f) Procurement Assistance	
(g) Construction	
(h) Other	
(i) Total Direct Charges	$
(j) Indirect Costs Rate $ Base	
(k) Total (EPA Share 100 %) (Other Agency Share 0 %)	$ *

22 Is equipment authorized to be furnished by EPA or acquired with EPA funds? ☐ Yes ☒ No
(Identify all equipment costing $1,000 or more)

23 Are any of these funds being used on extramural agreements? ☒ Yes ☐ No *(See Item 21f)*

☐ Grant, ☐ Cooperative Agreement, or ☒ Procurement

Contactor, Recipient Name *(if known)*	Total Extramural Amount Under This Project	Percent Funded by EPA *(if known)*
Unknown	* (Estimate)	100

PART III — PAYMENT METHODS AND BILLING INSTRUCTIONS

24 ☒ Disbursement Agreement

☒ Reimbursement — Request for reimbursement of actual costs will be itemized on SF 1081 or SF 1080 and submitted to the Financial Management Office, Environmental Protection Agency, 26 West St Clair, Cincinnati, OH 45268

☒ Monthly ☐ Quarterly ☐ Upon Completion of Work

☐ Advance — Only available for use by Federal agencies on working capital fund or with appropriate justification of need for this type of payment method. Unexpended funds at completion of work will be returned to EPA. Quarterly cost reports will be forwarded to the Financial Management Office, Environmental Protection Agency, 26 West St. Clair, Cincinnati, OH 45268

☐ Allocation Transfer — Used to transfer obligational authority or transfer of function between Federal agencies. Must receive prior approval by the Office of the Comptroller, Budget Division, Budget Formulation and Control Branch, EPA Headquarters

25 ☐ Reimbursement Agreement

Other Agency's IAG Identification Number

Billing Address

Environmental Protection Agency
Financial Management Division
Room 24
26 W. St. Clair
Cincinnati, Ohio 45268

Billing Instructions and Frequency

PART IV — ACCEPTANCE CONDITIONS	IAG IDENTIFICATION NO

26 General Conditions

The other agency covenants and agrees that it will expeditiously initiate and complete the project work for which funds have been awarded under this agreement.

27 Special Conditions:

See Attachment B

Part V — OFFER AND ACCEPTANCE

NOTE: 1) For disbursement actions, the agreement/amendment must be signed in duplicate and one original returned to the Grants Administration Division for Headquarters agreements and to the appropriate EPA IAG administration office for Regional agreements within 3 calendar weeks after receipt or within any extension of time as may be granted by EPA. The agreement/amendment must be forwarded to the address cited in Item 28 after acceptance signature.

Receipt of a written refusal or failure to return the properly executed document within the prescribed time may result in the withdrawal of the offer by the Agency. Any change to the agreement by the other agency subsequent to the document being signed by the EPA Action Official which the Action Official determines to materially alter the agreement/amendment shall void the agreement/amendment.

2) For reimbursement actions, the other agency will initiate the action and forward two original agreements/amendments to the appropriate EPA program office for signature. The agreements/amendments will then be forwarded to the appropriate EPA IAG administration office for acceptance signature on behalf of the Environmental Protection Agency. One original copy will be returned to the other agency after acceptance.

EPA IAG Administration Office *(for administrative/management assistance)*	EPA Program Office *(for technical assistance)*
28 Organization/Address EPA IAG Admin. Office Organizational/Address	29 Organization/Address EPA Program Office Organization/Address

Decision Official on Behalf of the Environmental Protection Agency Program Office

30 Signature	Typed Name and Title	Date

Action Official on Behalf of the Environmental Protection Agency

31 Signature	Typed Name and Title	Date

Authorizing Official on Behalf of the Other Agency

32 Signature	Typed Name and Title	Date

E. SCOPE OF WORK CATEGORIES

1) Remedial Investigation/Feasibility Study (RI/FS) Negotiation Support:

The USACE may be requested to provide technical assistance to the negotiating team, by reviewing all relevant technical documents, attending meetings, and serving as a technical advisor in matters relating to the characterization of the level and extent of contamination and in the development of alternatives for remediation (cleanup) of the site. In most cases, EPA's contractors will prepare an RI/FS Scope of Work for use in the negotiations with the PRPs. The USACE may assist in the development and review of this document.

3) Oversight of the Potentially Responsible Party (PRP) RI/FS:

If the negotiations are successful, the USACE may be requested to support EPA's oversight role. This support may include both field and office activities. Typical activities may include reviewing the PRP'S Work Plan, oversight of field investigations, reviewing the draft and final RI/FS. In addition, the USACE may be requested to attend meetings and serve as a technical advisor.

4) Remedial Design/Remedial Action (RD/RA) Negotiations:

The USACE may be requested to provide technical assistance to the negotiating team. This may include a review of the RI/FS, Record of Decision (ROD) and other relevant technical documents. In addition, the USACE may attend meetings and provide technical input to the consent decree. The USACE may be requested to assist in the preparation and review of monitoring plans to evaluate the effectiveness of the remedy.

5) Expert Witness/Consultant:

If negotiations for the RD/RA are unsuccessful, or the government seeks to recover its costs, the USACE may be requested to serve as an expert witness/consultant. If full litigation is required, the USACE may be asked to testify as to their knowledge of site conditions, work performed by the USACE and other information relevant to the case.

6) Oversight of PRP Remedial Design (RD):

If the negotiations are successful or the PRPs are compelled to perform the RD, the USACE may be requested to review the plans and specifications developed by the PRP and provide comment to EPA on the predicted effectiveness of the design.

7) Oversight of PRP Remedial Action (RA):

If the negotiations are successful or the PRPs are compelled to perform the RA, the USACE may be requested to provide oversight of the PRPs or their contractors during the remedial action. The purpose of this assignment is to ensure that plans and specifications developed during the design phase are implemented correctly during the construction phase. This assignment is primarily a field quality assurance of construction methods, specifications, and materials described in the design documents.

8) Special Studies:

The USACE may provide, on a limited basis, special studies and investigations to support ongoing enforcement actions. Examples of special studies are: focused feasibility studies, analysis of dam stability, dredging programs, rivers and harbors, and flood plain delineation.

ATTACHMENT B

1. COST DOCUMENTATION REQUIREMENTS

EPA acting as manager of the Hazardous Substance Response Trust Fund, requires current information on CERCLA response and related obligations of CERCLA funds for these actions. In addition, CERCLA authorizes EPA to recover from responsible parties all government costs incurred during a response action.

In order to help assure successful recovery of CERCLA funds, USACE shall maintain site specific accounts and documentation of the following:

- o Employee hours and salary (timesheets)
- o Employee travel and per diem expenses (travel authorizations, paid vouchers, and treasury schedules)
- o Receipts for materials, equipment, and supplies
- o Contract costs (paid invoices, treasury schedules and copy of the contract.
- o Any other costs not included in the above categories

In the event of a cost recovery action, within three weeks from the date of a request from EPA or the Department of Justice (DOJ), the USACE will provide to EPA or DOJ site specific costs and copies of the backup documentation which supports those costs. The USACE will provide EPA with a contact for obtaining such site specific accounting information and documentation. This cost information and documentation must also be available for audit or verification on request of the Inspector General.

2. REPORTING REQUIREMENTS

The USACE will provide the EPA with a completed signed SF 1080 and monthly reports containing:

- o USACE estimate of the percentage of project completed.
- o USACE estimate od dollars expended on the project to date.
- o Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period.
- o Summaries of all problems or potential problems encountered during the reporting period,
- o Projected work for the next reporting period.

ATTACHMENT B

Monthly progress reports will be submitted to the Regional Project Officer and the Chief, Technical Support Branch (WH-527), EPA, Washington, D.C. 20460.

Reimbursement is contingent upon receipt and approval by EPA of the monthly progress and financial reports from the USACE and any other reports described in the EPA site specific scope of work.

11. OTHER TECHNICAL RESOURCES

In this section a listing is provided of on-line computer systems that may provide information or assistance to a RCRA inspector, and a listing of useful reference documents is also provided.

11.1 ON-LINE COMPUTER SYSTEMS

- OHMTADS - (Contact Terry Ebb - (202) 382-7734) is an EPA computerized information retrieval system that may be accessed to help in the identification of materials from inspector observations (e.g., smell, color, etc.) made at a waste site. OHMTADS is a computerized data retrieval system available in the form of a computer print-out, manuals, or microfiche. For each of more than 1,000 oil and hazardous substances, there are 126 possible information segments on, for example, toxicity and associated hazards, personnel safety precautions, cleanup and disposal methods, materials handling, and fire fighting. However, not all information is available for all materials.

- HACS - The Hazard Assessment Computer System may be accessed through the U.S. Coast Guard's National Response Center (800) 424-8802. HACS provides computerized information on methods for estimating quantities of chemicals which may be part of a release, the rate of dispersion, and methods for predicting any potential toxicity, fire, or explosive hazards. This system was designed for use by On-Scene Coordinators involved in CERCLA actions.

- TOXLINE - Toxicological Information On-Line; MEDLARS Management Section, Specialized Information Services, National Library of Medicine, 8600 Rockville Pike, Bethesda, MD 20909; (301) 496-6193 or 1-800-638-8480.

  This data base is contained in the NLM MEDLARS program and contains information on the toxicological and health effects of chemical substances.

- EROS Data Center, User Services, Siox Falls, SD 57198, telephone (504) 594-6511, ext. 151.

  The EROS system, run by the U.S. Geological Survey, uses remote-sensing techniques (satellite and high altitude photography) to inventory, monitor, and manage natural resources. EROS includes research and training in the interpretation and application of remotely sensed data and provides these data at nominal cost. EROS also acts as a clearing house for information on photographs and images maintained by the government and private agencies.

  At the heart of the EROS Data Center is a central computer complex which controls a data base of over 6 million images and photographs of the earth's surface features, searches for geographic data on areas of interest, and serves as a management tool for the entire data reproduction process. The computerized data storage and retrieval system is based on latitude and longitude, supplemented by information about image quality, cloud cover, and type of data.

  Information received from the EROS Data Center can be used in much the same way as information received from the Environmental Monitoring and Support Laboratory. EROS data provides a chronological overview of an area, thereby establishing the extent of damage over time.

11.2 REFERENCE DOCUMENTS

All of the documents on the following list were reviewed, and many excerpted, for the preparation of this manual. These documents should provide inspectors with a wealth of information relating to the case development. One caution is provided however. The documents span a range of eight years While some parts of older documents may be outdated, there are also many instances where older references contain the most valuable information. The reader is cautioned to check several of the more recent documents on any given subject, before relying solely on the earlier documents.

USEPA

- RCRA Inspection Manual, Draft Document - 1987
- Compliance/Enforcement Guidance Manual - 1984
- Test Methods for Evaluating Solid Waste (SW-846) - 1986
- RCRA Ground-water Monitoring Technical Enforcement Guidance Document - 1986
- Final RCRA Comprehensive Ground-water Monitoring Evaluation Guidance Document - 1986
- Draft NPDES Compliance Inspection Manual - 1987
- Waste Analysis Plans - A Guidance Manual - 1984
- Contractor Requirements for Control and Security of RCRA Confidential Business Information - Draft - 1984
- Ground-water Monitoring Guidance for Owners and Operators of Interim Status Facilities - Draft - 1983
- Samplers and Sampling Procedures for Hazardous Waste Streams - 1980
- Handbook for Monitoring Industrial Wastewaters
- Field Monitoring and Analysis of Hazardous Materials - Training Manual - 1981